

Your dedicated Partner for growth.

Masterbatches for Agricultural applications



Today's agricultural and crop production challenges require innovative solutions

LyondellBasell's wide range of masterbatch solutions offers the broadest functional performance along with market expertise. We are committed to deliver dedicated customized solutions to meet your agricultural needs. Our global presence confirms that we have the global and regional footprint and technical support service to help your business grow wherever you are.

We recognize the multiple challenges the agricultural markets are facing and we offer several solutions that can help you drive profitable growth.



YOUR BENEFITS

- Benefit from our customized solutions.
- Take advantage of our wide range of masterbatches.
- Expand your regional footprint with a global player.



Agricultural plastics help to meet worldwide challenges

Agricultural plastics play a key role in the efficient and sustainable production of crops. For example, thanks to the use of mulch films, considerable savings can be achieved as less water and fewer fertilizers are needed. Another example is the plastic greenhouses that offer the possibility of creating the appropriate environmental conditions that plants require for faster growth. Furthermore, the use of bale wrap plastic films allows for better preservation and easier transportation of fodder.

LyondellBasell has been serving key global customers for more than 20 years. Over the years, the company has acquired an extensive understanding of how different climates and weather conditions require specific solutions, especially in terms of UV stabilized materials and light and temperature control. The company's global presence and technical expertise enables LyondellBasell to support the business on a world wide base.

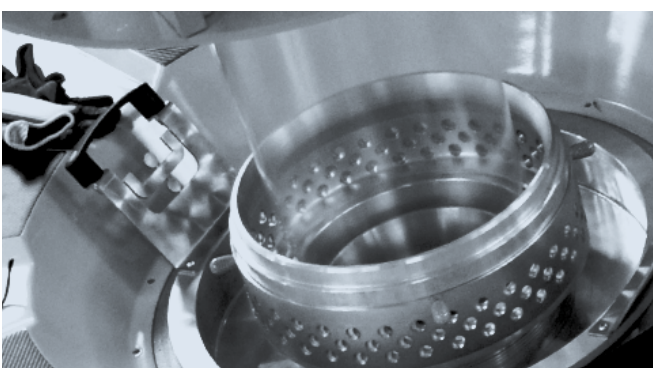
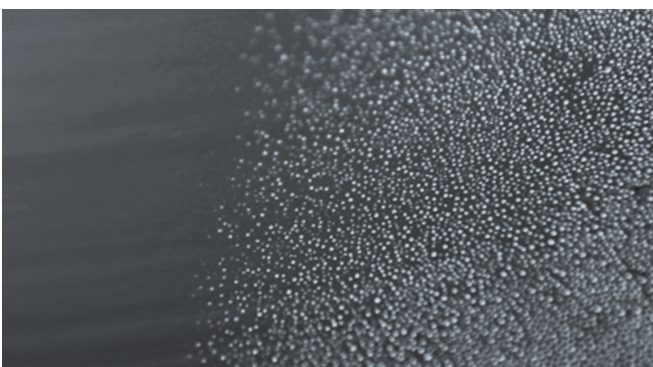
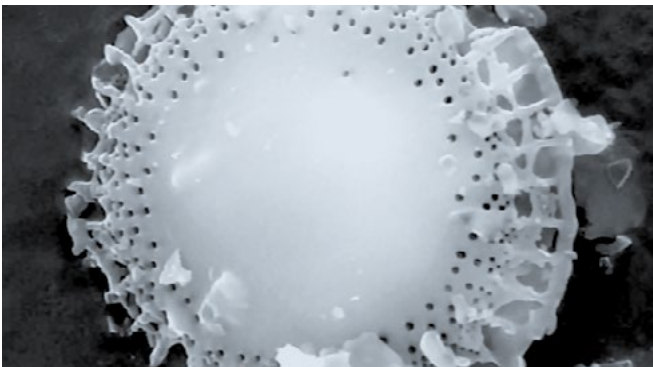
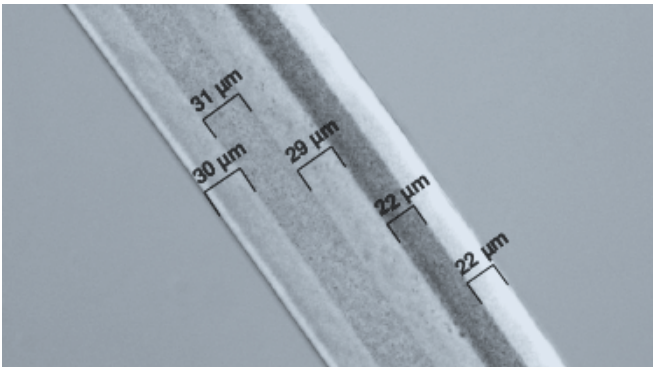
LyondellBasell, your partner in agricultural innovation

The technical expertise in agriculture developed by LyondellBasell allows us to provide you with a broad range of proven tailor-made masterbatch solutions that target your specific needs and support your new developments. Due to close collaborations with research institutes and key suppliers, our teams of R&D engineers, application specialists and market experts have access to the latest state-of-the-art agricultural technology, which offers you a unique point of access to the latest R&D information, market trends and customized technical support.

In addition to strong technical expertise, LyondellBasell's customers will benefit from the company's well equipped labs. The global competence centers host highly specialized equipment, including:

- **Accelerated aging equipment** (Weather-Ometer, SEPAP, Wheel of Bandol, QUV) for simulating long term outdoor exposure and enabling a quick test of durability and color retention.
- **UV-VIS** (Ultraviolet-Visible) and **FTIR** (Fourier Transform Infrared) spectrometers for the visualization of the film's UV absorption and its thermal behavior at night (far-IR transmission measurements), respectively.
- **BYK-Gardner Haze** for haze measurement of agricultural films.
- **GC-MS** (Gas Chromatography-Mass Spectrophotometry), **HPLC** (High Performance Liquid Chromatography) for quantification of antioxidants and HALS, respectively.
- **X-ray fluorescence spectrometer** for the quantification of the sulphur and Cl levels on a prematurely degraded greenhouse film.
- **Scanning Electron Microscope** for the identification of impurities/defects in multi-layer greenhouse films down to the nanometer level.
- **Anti-fog cabinet** for the evaluation of the anti-fog performance of greenhouse films.

In addition to this extensive list of analytical equipment, we also have several film extruders (including a five-layer blown film co-extrusion line) supporting the development of new products.





LyondellBasell's complete range of masterbatches for agricultural markets

Masterbatches sold in the agricultural markets must provide a wide variety of functionalities. Discover LyondellBasell's broad portfolio with efficient solutions for an extensive range of applications.

Greenhouse and small tunnel

The main purpose for a greenhouse cover is to create a controlled micro-climate beneficial for the crops. LyondellBasell's masterbatches allow for the desired environment to be created inside the greenhouse, mainly in terms of light and temperature, for better crop quality and yield.

- Infrared masterbatches (temperature management at night)
- Diffuser masterbatches (light scattering management)
- Near-Infrared masterbatches (temperature management at day)
- Anti-fog masterbatches (light management and crop protection)
- Complete range of UV absorber and UV stabilizer masterbatches with improved resistance to herbicides and pesticides (durability management)
- Antidust masterbatch (light management)

Greenhouse / big tunnel

Type	Product	Composition	Customer benefits
Infrared	<i>Polybatch</i> IR 1515 ES	Functional natural filler	Conserve heat inside the greenhouse by reducing temperature gap between night and day. Provide medium thermicity and medium light diffusion.
	<i>Polybatch</i> IR CFLD-50	Functional natural filler	Conserve heat inside the greenhouse by reducing temperature gap between night and day. Provide higher thermicity and higher light diffusion (vs. <i>Polybatch</i> IR 1515 ES). Also available in combination with CaCO ₃ when looking for higher light diffusion.
	<i>Polybatch</i> IR CFLD-60 S	Functional natural filler	Conserve heat inside the greenhouse by reducing temperature gap between night and day. Provide lower thermicity and higher light diffusion (vs. <i>Polybatch</i> IR CFLD-50).
	<i>Polybatch</i> IR 2994	Proprietary information	Conserve heat inside the greenhouse by reducing temperature gap between night and day. Provide medium thermicity, low diffusion with very limited impact on the PAR transmission (suitable for use in cold climate regions).
Light Diffuser	<i>Polybatch</i> LDC 80	Functional natural filler	Decrease the risk of plant stress due to strong direct sunlight. Avoid shadow effects due to light diffusion hereby reaching more leaf surface. Recommended use in regions with intense sunlight.
Near-Infrared Reflector	<i>Polybatch</i> NIR 4261	Patented technology	Prevent overheating and minimize temperature shocks during the day in hot climate regions to reduce plant stress and limit water evaporation. New technology.
	<i>Polybatch</i> NIR 7707	Special pigments	Regulate temperature inside the greenhouse in hot climate regions during the day to reduce plant stress and limit water evaporation.
Anti-fog	<i>Polybatch</i> AF-G 11	Anti-fog additives	Prevent drop formation at the film surface to limit light loss, avoid crop damage due to sun burn effect and avert diseases due to wet plants. Long term effect. Suitable for LDPE and EVA based greenhouse films.
UV Stabilizers	<i>Polybatch</i> ACS 15	Ni-Quencher + UVA	Prevent premature degradation of greenhouse films due to UV light and pesticides exposure. Good resistance to pesticides due to low interaction with sulfur, halogen or phosphorous based acidic substances. Greenish color.
	<i>Polybatch</i> UVR 96	HALS	Prevent premature degradation of greenhouse films due to UV light and pesticides exposure. Low resistance to pesticides: max total concentration of 500 ppm S / 50 ppm Cl / 50 ppm Fe (with a maximum of 150 ppm S per year for a three years film). (*)
	<i>Polybatch</i> ACT 164	HALS	Prevent premature degradation of greenhouse films due to UV light and pesticides exposure. Medium resistance to pesticides: max total concentration of 1000 ppm S / 75 ppm Cl / 50 ppm Fe (with a maximum of 350 ppm S per year for a three years film) (*)
	<i>Polybatch</i> UVS 421	HALS + UVA	Prevent premature degradation of greenhouse films due to UV light and pesticides exposure. High resistance to pesticides: max total concentration of 1500 ppm S / 100 ppm Cl / 50 ppm Fe (with a maximum of 750 ppm S per year for a two years film). (*)
	<i>Polybatch</i> UVS 2220	NOR HALS + UVA	Prevent thermal degradation of greenhouse films in contact with greenhouse structure and premature degradation due to UV light and pesticides exposure. Superior resistance to pesticides: max total concentration of 3000 ppm S / 200 ppm Cl / 50 ppm Fe (with a maximum of 1000 ppm S per year for a three years film). (*)
Antidust	<i>Polybatch</i> AD 20	Surface modifier	Prevent dust accumulation on greenhouse film to limit cleaning. Not suitable for greenhouses used in hot climate regions if white washed.

(*) 200 microns film, 140 Kilolanglely

Small tunnel

Although many grades used in greenhouse or big tunnel applications can also be used in small tunnel, we recommend the following grades specifically suited for this application.

Type	Product	Composition	Customer benefits
UV Stabilizer	<i>Polybatch</i> UVK 92	HALS	Prevent premature degradation of the film due to UV light.
Anti-fog	<i>Polybatch</i> AF 389	Anti-fog additives	Prevent drop formation at the film surface to limit light loss, avoid crop damage due to sun burn effect and avert diseases due to wet plants.



Mulch film

The use of mulch film allows the creation of more favorable conditions for plant growth. In addition, the mulch films enable more efficient production conditions. Films require precise specifications in terms of opacity, light reflection and durability in order to create the ideal environment for the crops.

LyondellBasell masterbatches meet the needs required by this market including:

- Durable white masterbatch (temperature and light reflection management for accelerated growth)
- Black masterbatch (temperature and weed control)
- Color masterbatches for selective mulch films: brown, dark and light green, yellow, silver, etc. (temperature and light reflection management for accelerated growth)
- UV masterbatches
- Range of bio-based masterbatches, OK Compost certification possible
- Anti-fog masterbatch (specially designed for earlier asparagus harvesting)

Mulch

Type	Product	Composition	Customer benefits
White	<i>Polywhite 8000 CL</i>	Durable TiO ₂	Limit soil temperature increase in hot climate regions and enhance crop yield by reflecting the light. Optimal weathering performance.
Black	<i>Polyblak 1423/20</i>	P type carbon black	Slightly increase soil temperature allowing earlier plantation combined with weed growth control. Optimal weathering performance.
	<i>Polyblak 7260</i>	HAF type carbon black + fillers	Slightly increase soil temperature allowing earlier plantation combined with weed growth control. Economic grade.
	<i>Polyblak L 1860</i>	SRF type carbon black + fillers	Slightly increase soil temperature allowing earlier plantation combined with weed growth control. Economic grade.
Green	<i>Polybatch 302216</i>	Pigments concentrate	Increase soil temperature allowing earlier plantation combined with weed growth control. Enhance fruit growth when used in outside layer. Suitable for pepper and melon cultivation.
Red	<i>Polybatch 5807</i>	Pigments concentrate	Enhance fruit growth when used in outside layer. Especially suitable for tomato cultivation.
Brown	<i>Polybatch L 0070/16</i>	Pigments concentrate	Increase soil temperature allowing earlier plantation combined with weed growth control. Enhance fruit growth when used in outside layer. Suitable for melon cultivation.
Silver	<i>Polybatch 7030</i>	Pigments concentrate	Reflect UV-light to repel insects and decrease the risk of viral diseases. Reflecting UV-light also enhances sugar content and pigmentation in different types of fruit.
Yellow	<i>Polybatch L 2546</i>	Pigments concentrate	Attracts insects to control invasion of pests such as whiteflies when used in outside layer to avoid crop damage. Heavy metals free.
UV Stabilizer	<i>Polybatch UVK 92</i>	HALS	Prevent premature degradation of black mulch films due to UV light. Moderate resistance to pesticides.
Anti-fog	<i>Polybatch AF 389</i>	Anti-fog additives	Prevent drop formation at the film surface to increase soil temperature and accelerate the harvesting (e.g. asparagus cultivation).
Anti-oxidant	<i>Polybatch AO 25</i>	Anti-oxidant	Prevent premature degradation of black mulch films due to heat.

Bio mulch

Type	Product	Composition	Customer benefits
Bio White	<i>Polywhite MTB 8757</i>	TiO ₂	Limit soil temperature increase in hot climate regions and enhance crop yield by reflecting light. Mater-Bi based.
	<i>Polywhite EF 8000</i>	TiO ₂	Limit soil temperature increase in hot climate regions and enhance crop yield by reflecting light. Ecoflex based.
Bio Black	<i>Polyblak MTB 7255</i>	P type carbon black	Slightly increase soil temperature allowing earlier plantation combined with weed growth control. Mater-Bi based - OK Compost certified.
	<i>Polyblak EF 707336</i>	P type carbon black	Slightly increase soil temperature allowing earlier plantation combined with weed growth control. Premium grade, Ecoflex based.
	<i>Polyblak PLA 7255 P</i>	P type carbon black	Slightly increase soil temperature allowing accelerated planting combined with weed growth control. PLA based.

* Color masterbatches for photo selective bio mulch films available upon request (e.g. Ecoflex based)



Silage film (bunker and bale wrap film)

The purpose of using silage films is to conserve and store nutrients in air-free conditions. Bale wrap films must have excellent mechanical properties and UV resistance, requiring the use of high quality masterbatches.

LyondellBasell's product range consists of:

- Durable white masterbatch and combibatch (durable white and UV stabilization) with excellent dispersion
- Black masterbatches
- UV masterbatches (including grades with limited interaction with polyisobutylene when used in bale wrap films)
- Color masterbatches with excellent dispersion (mainly dark and light green color coupled with UV stabilization)
- Polyisobutylene masterbatches (tackifier)

Stretch silage

Type	Product	Composition	Customer benefits
White	<i>Polywhite 8000 CL</i>	Durable TiO ₂	Provide white color to silage films. Optimal weathering performance.
Black	<i>Polycolor L SW 704</i>	P type carbon black + AO	Provide black color to silage films. Optimal weathering performance.
White combibatch inner layer	<i>Polycolor L SW 802/8 M</i>	Pigments + HALS + AO	Provide white color to silage films. Optimal weathering performance. Contain UV stabilization for Medium Kly exposure (140 Kly)*
Dark green combibatch inner layer	<i>Polycolor L SW 310/5,4 M</i>	Pigments + HALS + AO	Provide dark green color to silage films. Contain UV stabilization for Medium Kly exposure (140 Kly)*
Light green combibatch inner layer	<i>Polycolor L SW 300/5,4 M</i>	Pigments + HALS + AO	Provide light green color to silage films. Contain UV stabilization for Medium Kly exposure (140 Kly)*
Black combibatch inner layer	<i>Polycolor L SW 702/7,5 M</i>	Pigments + HALS + AO	Provide black color to silage films. Contain UV stabilization for Medium Kly exposure (140 Kly)*
UV Stabilizers	<i>Polybatch UVS 220 (ST)</i>	HALS (+ AO)	Prevent premature degradation of the film. To be used in transparent outer layers.
	<i>Polybatch UVR 96 (ST)</i>	HALS (+ AO)	Prevent premature degradation of the film. To be used in colored inner layer.
Tackifiant	<i>Polybatch TAC 100</i> <i>Polybatch TAC 150</i>	PIB	Provide tackiness to the film to avoid oxygen penetrating the bale.

* also available for Low and High Kly exposure - Tailor-made colors available upon request

Bunker silage

Type	Product	Composition	Customer benefits
White	<i>Polywhite 8000 CL</i>	Durable TiO ₂	Provide white color to silage films (outer layer) to prevent overheating in the silo (light reflection). Optimal weathering performance.
Black	<i>Polyblak 1423/20</i>	P type carbon black	Provide black color to silage films (inner layer) to protect silage grass from light. Optimal weathering performance.
	<i>Polyblak 7260</i>	HAF type carbon black + fillers	Provide black color to silage films (inner layer) to protect silage grass from light. Economic alternative to Polyblak 1423.
UV Stabilizers	<i>Polybatch UVR 96</i>	HALS	Prevent premature degradation of the film. To be used for the stabilization of the upper white layer.
	<i>Polybatch UV 3946 DC</i>	HALS	Prevent premature degradation of the film. To be used for the stabilization of the upper white layer. Avoid risk of phenolic yellowing during dark storage.



Textiles, twines and geomembranes

Agrotexiles are used in a wide variety of applications for crop protection against weed, pests (e.g. birds) and extreme weather conditions (such as intense sunlight, hail, etc.). LyondellBasell masterbatches provide the key properties needed to assure easy processing as well as excellent UV resistance.

The main objective of geomembranes is water management which requires high durability to prevent premature degradation caused by UV light and high temperatures.

LyondellBasell can offer the following products:

- Black and white masterbatches for agrotexiles
- UV masterbatches (including grades without pigment interaction)
- Black masterbatches for geomembranes (with variable antioxidant stabilization)

Please contact your local sales representative for more information on these and other available or customized masterbatches and/or combibatches. In addition to our business in agricultural applications, LyondellBasell can also provide you with high quality solutions for many other different markets.

Textiles / Twines

Type	Product	Composition	Customer benefits
White	<i>Polycolor P 8350 CL FR 6</i>	Durable TiO ₂	Provide white color to spunbond fabrics. Especially formulated for smooth production. Optimal weathering performance.
Black	<i>Polycolor P 7073/2,4</i>	P type carbon black	Provide black color to polypropylene multi-filament yarn.
	<i>Polycolor P 7085 SC</i>	Special carbon black	Provide black color to polypropylene multi-filament yarn. Premium grade, especially formulated to reduce filament breakage during production.
UV Stabilizers	<i>Polybatch UVS 220</i>	HALS, PE based	Prevent premature degradation of the polyethylene due to UV light. Suitable for the stabilization of HDPE netting with improved resistance to pesticides.
	<i>Polybatch L UVS 2020</i>	HALS, PE based	Prevent premature degradation of the polyethylene due to UV light. Suitable for the stabilization of HDPE netting. No interaction with pigments.
	<i>Polybatch FPP UV 2120 SP</i>	HALS, PP based	Prevent premature degradation of the polypropylene due to UV light. Suitable for the stabilization of polypropylene multi-filament yarn. No interaction with pigments, no impact on melt flow.

Specific color masterbatches available upon request

Geomembranes

Type	Product	Composition	Customer benefits
Black	<i>Polyblak 1423/20</i>	P type carbon black	Provide black color to the geomembrane and prevent premature degradation due to UV light. No antioxidant stabilization.
	<i>Polyblak LD-3548</i>	P type carbon black + AO	Provide black color to the geomembrane and prevent premature degradation due to UV light and heat. Low antioxidant stabilization.
	<i>Polyblak LD-32273</i>	P type carbon black + AO	Provide black color to the geomembrane and prevent premature degradation due to UV light and heat. Medium antioxidant stabilization.
	<i>Polyblak LD-32142</i>	P type carbon black + AO	Provide black color to the geomembrane and prevent premature degradation due to UV light and heat. High antioxidant stabilization.

Hydroculture

Type	Product	Composition	Customer benefits
White	<i>Polywhite 8000 CL</i>	Durable TiO ₂	Provide white color. Optimal weathering performance.
Black	<i>Polyblak 1423/20</i>	P type carbon black	Provide black color. Optimal weathering performance.
UV Stabilizers	<i>Polybatch UV 3946 DC</i>	HALS	Prevent premature degradation of the film due to UV light. Especially designed to protect white films. Limit the risk of pinking issue.

Miscellaneous

Type	Product	Composition	Customer benefits
Antioxidant	<i>Polybatch AO 25</i>	Antioxidants	Limit thermal degradation of polyethylene mainly during its processing. Suitable for processes where temperature does not exceed 260°C (e.g. blown film extrusion)
Flame retardant	<i>Polybatch HF-FRPP 243</i>	Halogen free (proprietary combination)	Provide flame retardant behavior to polyethylene films. Suitable for thin film applications (<100 µm) like energy screens,...
Processing-aid	<i>Polybatch AMF 705 HF</i>	PPA	Avoid melt fracture issue when linear low density polyethylene is extruded on equipment with narrow gap die. Limit die build-up and degradation of the polymer during extrusion by reducing the residence time into the extruder.
Desiccant	<i>Polybatch AR 2475</i>	Calcium oxide	Absorb moisture. Suitable for the extrusion of humid recycled polymers. Highly filled masterbatch.

ABOUT US

LyondellBasell (NYSE: LYB) is one of the largest plastics, chemicals and refining companies in the world. Driven by its employees around the globe, LyondellBasell produces materials and products that are key to advancing solutions to modern challenges like enhancing food safety through lightweight and flexible packaging, protecting the purity of water supplies through stronger and more versatile pipes, improving the safety, comfort and fuel efficiency of many of the cars and trucks on the road, and ensuring the safe and effective functionality in electronics and appliances. LyondellBasell sells products into more than 100 countries and is the world's largest producer of polymer compounds and the largest licensor of polyolefin technologies. More information about LyondellBasell can be found at www.LyondellBasell.com.

For more information, visit lyb.com

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