SERÍM B&G

www.serimbng.co.kr/en/

BIODEGRADABLE MULCH FILM

(주)세림비앤지

BIODEGRADABLE MULCH FILM

SERIM B&G INC.

- Established in 2003
- Domestic #1 sales biodegradable product company
- Kosdaq-listed company
- 5 overseas compostable certifications and lots of domestic eco-friendly certifications
- Designated as an excellent environmental company by the Ministry of Environment in Korea

TUV

Promising Environmental Enterprise certificate

BPI

Leading Environmental company

ISO 14001

FSSC 22000

INNO-BIZ

Domestic Eco-friendly certificate

Vacuum Forming

Disposable containers, cups made from Biobased polymers (PLA, Bio-PET) and non-biodegradable polymers(PP, PS, PET etc.)

Biodegradable Film & Bags

Shopping bags, disposable gloves, Mulching films etc. made of biodegradable compounds

Biodegradable Compounds

Reconyl F series, S series, I series, Thermoplastic starch, compounds for agricultural mulching

WHAT IS MULCH FILM?

Mulch film is a film that covers the surface of the soil for reasons such as preventing weeds from growing, maintaining appropriate temperature in soil and soil moisture, and promoting root growth.

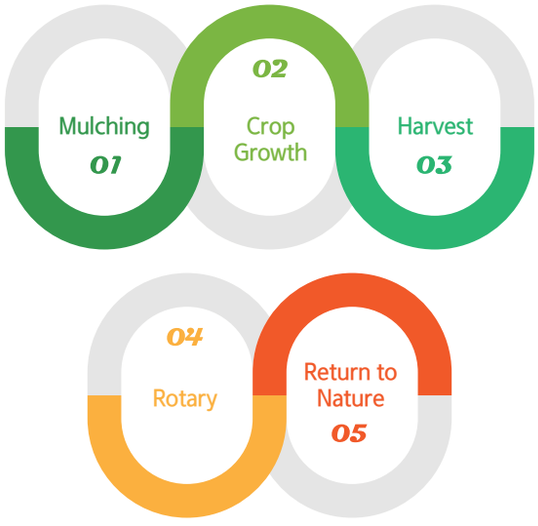
WHY SERIM'S MULCH FILM?

- Conventional Petrochemical Non-Biodegradable Mulch film
  - mostly are not recovered after use and left or incinerated, causing soil and water pollution.
  - is not easy to be collected due to the aging of the rural population, decreasing workforce, rising labor costs, and weakening of physical properties due to long-term oxidation by sunlight.
  - should be incinerated even though collected after use, and this causes air pollution.

- SERIM'S MULCH FILM is biodegradable and compostable which can prevent environmental pollution caused by plastic waste.
- SERIM'S MULCH FILM has the same functions and mechanical properties as the conventional non-biodegradable mulch film

ADVANTAGES OF SERIM'S MULCH FILM

- Decomposes into water and carbon dioxide by microorganisms in soil and returns to nature after use
- Biodegrades in soil after use and returns to nature, so there is no need for a separate recovery, and prevents environmental pollution caused by waste film from incineration
- Allows immediate rotary work after harvesting crops even if the film remains
- Eliminates the cost of waste plastic collection and waste disposal



PRICE COMPARISON

SERIM'S MULCH FILM	52USD / Roll		
PE MULCH FILM	33USD / Roll	Film Removal : 42USD / Roll (Labor charge)	+ Environment Pollution

■ Ultimately, it is cheaper than conventional mulch film

| Based on 1 roll (thichness: 0.02mm, width:100cm, length: 500M) |

| Cost of Labor in Korea | 111 USD/day

| Labor charge |

: 1 day labor charge(111 USD)/{working area per person per day(1,250㎡)÷1 roll per area(500㎡)}

PRODUCT TYPE

Property	Resin		Product	
ITEM	Reconyl M-FM1	Reconyl M-FM2	Reconyl FM1	Reconyl FM2
Melt Index (MI, g/10min)	9 ± 2	12 ± 1	-	-
Specific Gravity (g/㎤)	1.28	1.3	-	-
Melting Temp.	116 ℃		-	-
Component	Biodegradable resin + TPS	Biodegradable resin	Biodegradable resin + TPS	Biodegradable resin
Biodegradable Speed	Fast	Normal	Fast	Normal

Material Products

Mulch Film Products

PROCESS FOR BIODEGRADABLE COMPOUNDS

RECONYL M -FM1

01

Reconyl TPS + Biodegradable Resins

02

Blends

03

Compounding

04

Biodegradable compounds

RECONYL M -FM2

01

Biodegradable Resins

02

Blends

03

Compounding

04

Mulch film Resins

RECONYL M-FM1 & RECONYL M-FM2 GUIDELINE

Blown Film Extruder (Example)

| Film Extruder L/D | 35~40

| Screw Type | LDPE, LLDPE Screw type recommended

| Molding Temperature (Thermal Profile) |

Property	Cylinder1	Cylinder2	Cylinder3	Dice 1	Dice 2
Temperature (℃)	130~135	135~145	140~145	140~145	140~145

※ It can be changed by manufacturing temperature & machine conditions

| Bubble Cooling | Cooling air temperature below 18℃ is recommended

| Blow up Ratio | 2.5 or higher recommended

Resin Handling and Storage

1. Protect from moisture and impurities
2. Keep container closed
3. Store in a cool, dry place
4. Use within 5 months after purchase

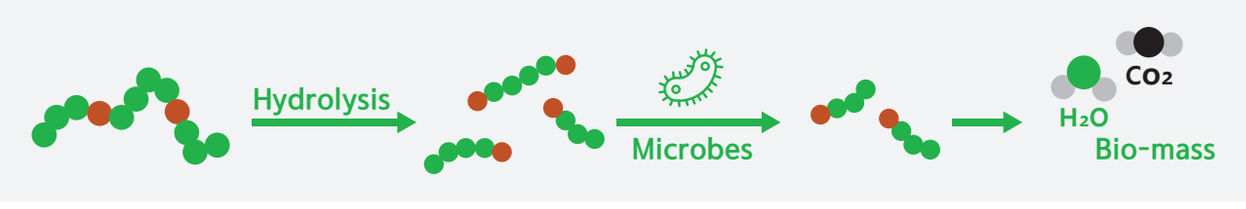
Film Cautions

- Store in a cool, dry place. Use within 1 year after purchase
- When mulching, be careful not to tear it with stone roots or sharp tree branches
- The biodegradation period may vary depending on the region, location, microbial conditions of the soil, etc
- Biodegradation generally takes 3 to 4 months in soil, so rotary work is recommended as soon as possible after harvesting crops

BIODEGRADATION MECHANISM

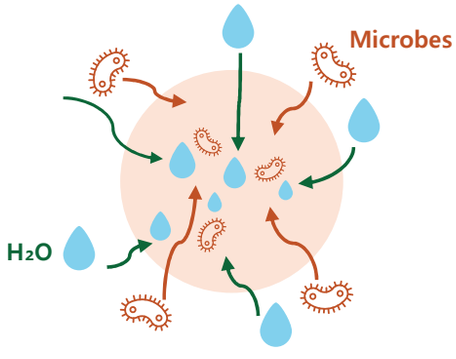
Biodegradable mulch film is finally biodegraded by microorganisms in soil into water and carbon dioxide under aerobic conditions with air, and into water and methane gas under anaerobic conditions without air, and returns to nature.

Biodegradable Polymer such as PBAT, PBS

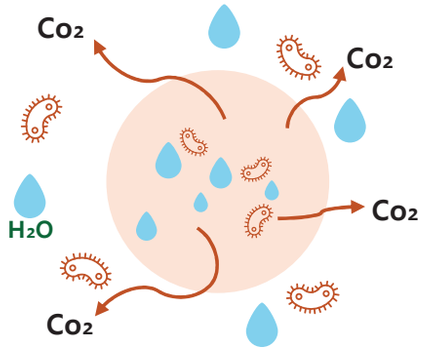


Natural Polymer (Thermoplastic Starch)

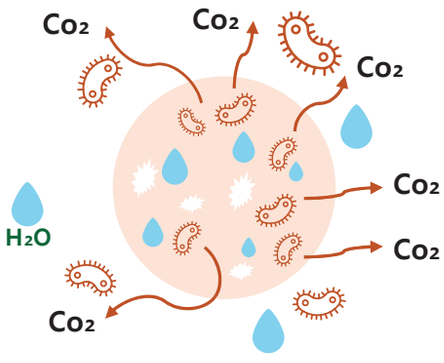
step 1 Water and microbes diffusion



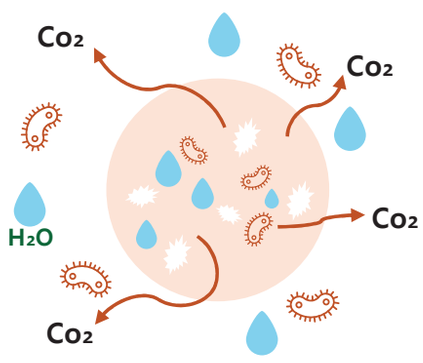
step 2 Hydrolysis and Co_2 release



step 3 Degradation and Co_2 Release



step 4 Porous structure and hormoginous degradation

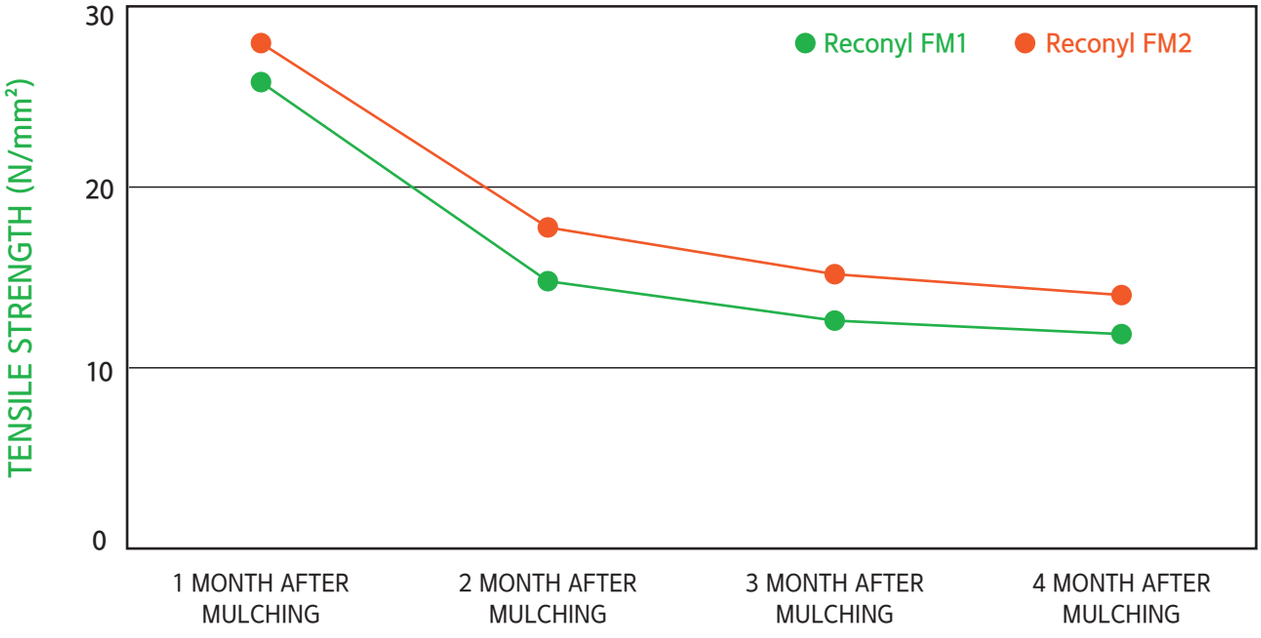


MECHANICAL PROPERTIES

Properties		Sample		Ref.
		Reconyl M-FM1 Reconyl FM1	Reconyl M-FM2 Reconyl FM2	PE
Tensile Strength (N/mm^2)	MD	26	28	25
	TD	21	22	18
Elongation (%)	MD	550	510	530
	TD	480	520	350
Tear Strength (N/mm)	MD	120	130	150
	TD	220	230	140

※ This data can be changed by manufacturing temperature & machine conditions

Changes in tensile strength according to mulching period



After 2 months, tensile strength is maintained over $10N/mm^2$, so there is no functional problem

EXAMPLE OF RECONYL MULCH FILM APPLICATION

View of the mulch film

Perilla

Bean

Chilli Pepper

Detail view according to crops

Eggplant

Chilli Pepper

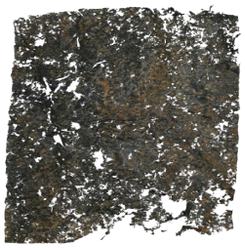
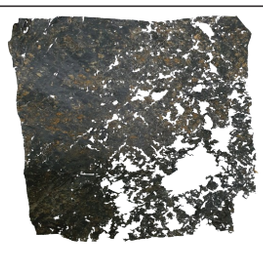
Sweet Potato

Perilla

Kimchi Cabbage

Tomato

Landfill Test (Assume reclamation in soil after plowing)

Sample	1 Month after landfill	2 Month after landfill	3 Month after landfill
Reconyl M-FM1 (Reconyl FM1)			
Reconyl M-FM2 (Reconyl FM2)			

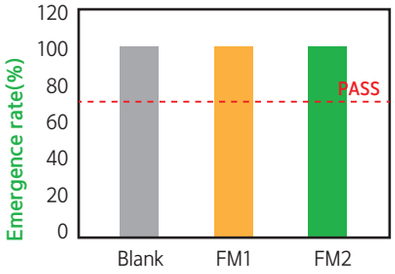
Terrestrial Plant Test (Seedling Emergence and Seedling Growth Test)

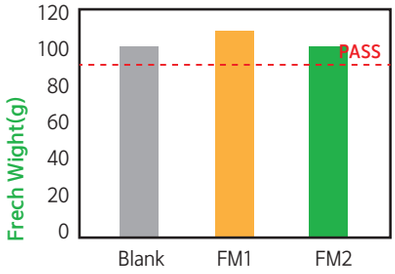
Even if it decomposes in soil, it will not affect the next crop at all.

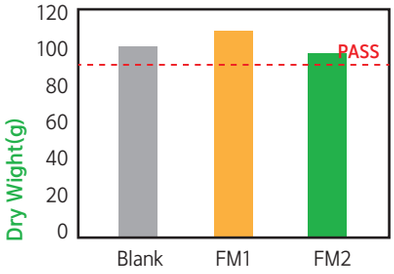
Test Sample : 3 types

- Reconyl FM1 : Soil in which more than 90% of fm1 has decomposed
- Reconyl FM2 : Soil in which more than 90% of fm2 has decomposed
- Blank : Normal soil

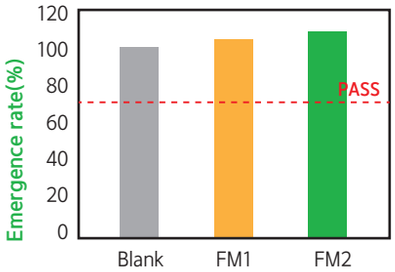
Monocotyledonease - Barley

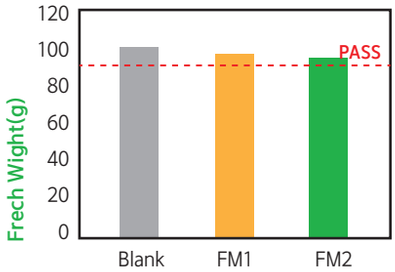


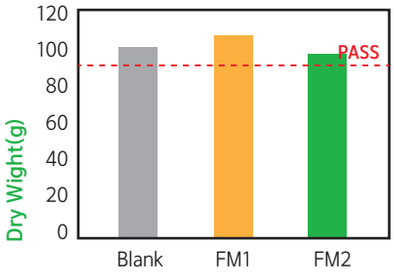




Dicotyledoneae-Lettuce







SERÍM B&G

SERIM B&G INC.

Head Office & Factory

154-51, Oseongbuk-ro, Oseongmyeon, Pyeongtaeksi, Gyeonggi-do, Republic of Korea
+82-31-684-9935~6 +82-31-684-9937~8

R&D Center

154-100, Oseongbuk-ro, Oseongmyeon, Pyeongtaeksi, Gyeonggi-do, Republic of Korea
+82-31-684-9935~6 ljy@serimbng.co.kr

Sales Headquarter

1001-1003 B dong, Yong-in Techno Valley 357, Gusung-ro, Kiheung-gu, Yonginsi, Gyeonggi-do, Republic of Korea
+82-31-898-0171(#630) kjh@serimbng.co.kr +82-31-898-0127