



EF POLYMER

EF Polymer

- Manufacturer of 100% natural and biodegradable superabsorbent polymers (SAP)
- Agriculture - Help farmers around the globe to grow more, while saving water and fertilizer
- Non-agriculture - Help corporations to replace conventional petroleum-based materials and drive green transformation (GX)



Problems We Are Tackling:

Climate Change is Causing Drought Globally

45% world population facing drought today

70% water available for human is used for agriculture

Map Information

- The **Drought Risk** indicator¹ results from the interactions between hazard (probability of a drought event), exposure (amount of population, livelihoods, assets, resources, and services in drought-prone areas), and vulnerability (susceptibility of exposed elements to suffer adverse effects when impacted by a drought event). The drought exposure derives from the combination of population (Source: JRC [GHS](#)), global agricultural lands (Source: [SEDAC](#)), gridded livestock of the world (Source: [FAO](#)), and baseline water stress (Source: [JRC](#)).
- The Baseline **Water Stress** indicator² measures the ratio of total water withdrawals (domestic, industrial, irrigation and livestock consumptive and non-consumptive uses) to available renewable water supplies. Higher values indicate more competition among users.

Water Stress² (Source: World Resources Institute - WRI)



Drought Risk¹

Source: JRC GDQ



* Warm and cold arid land, ice cap - *Temporal range 2000-2014, spatial resolution Hydrological sub-basin - *Temporal range 1960-2014, spatial resolution Hydrological sub-basin

Problems We Are Tackling:

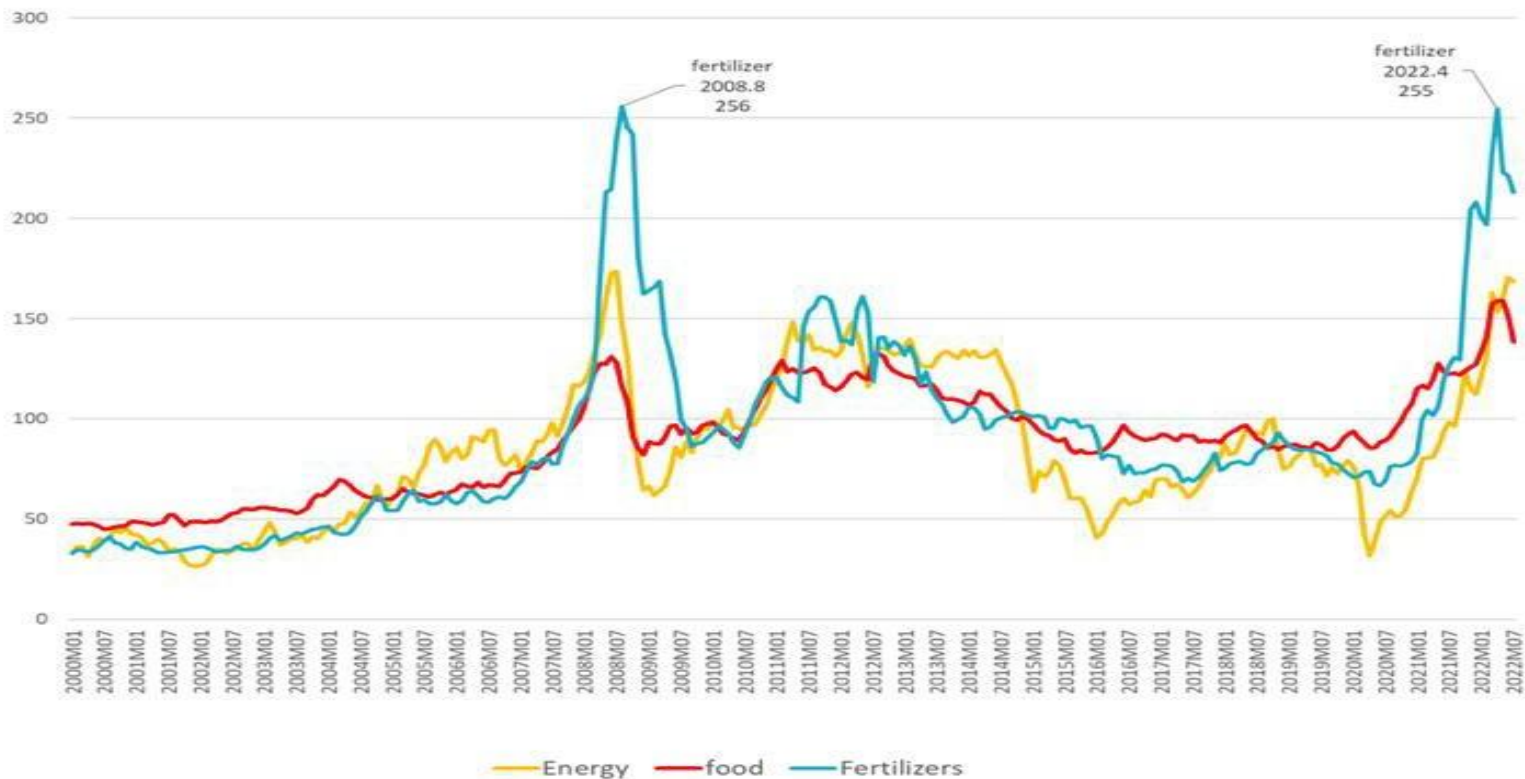
Drought is Causing 30 - 40% Yield Decrease for Farmers



Problems We Are Tackling:

Fertilizer cost is rising and is going to remain high...

World Bank Commodity Price Data (2010=100)



Our Vision – Circular Model

We upcycle locally collected bio-wastes to support farmers



Our Solution:

100% Natural, Upcycled Polymer from Agricultural Byproducts



Agricultural byproducts
(orange & banana peels)



Proprietary processing
(dry, grind, polymerize)



EF Polymer material
Applied across industries

Our Solution:

100% Natural Polymer

- Made of **bio-waste**
(Orange and Banana Peels)
- **1** g absorbs up to **50x** Water
- Effective for **6** months
- Fully biodegrades within **1** year



Our Solution:

100% Natural Water & Fertilizer Retaining Polymer

Effects:

Water up-to **40** % down

Fertilizer up-to **20** % down

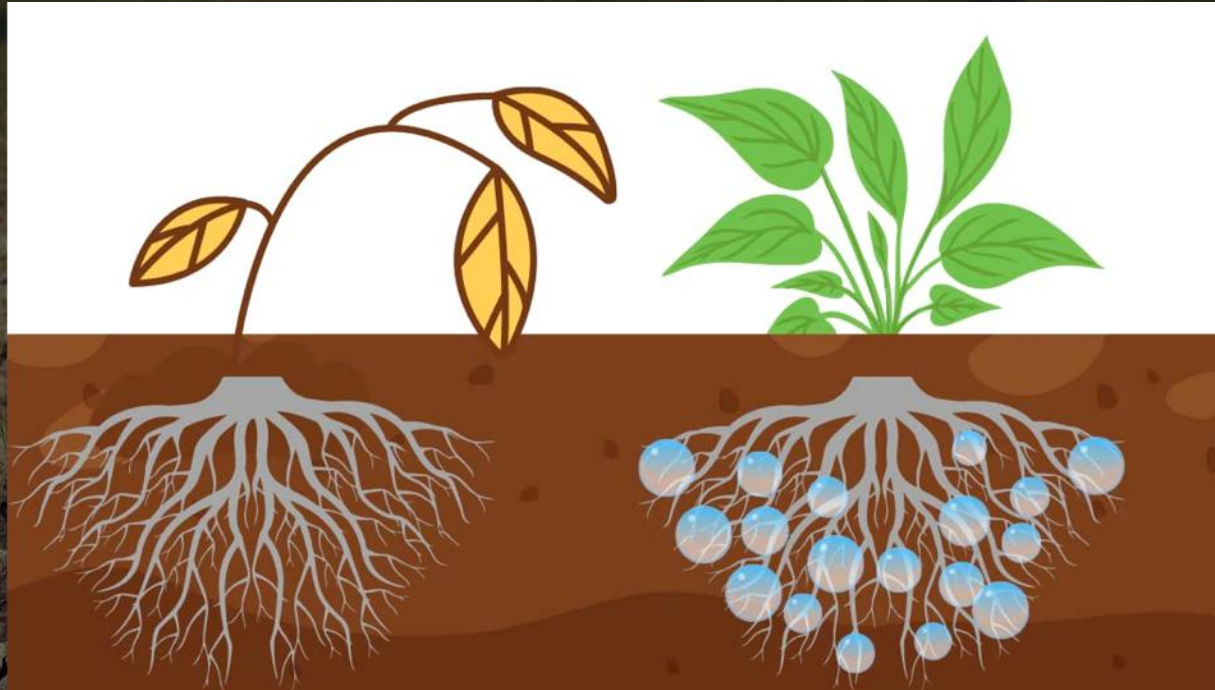
Yield stabilize



How EF Polymer Works in Soil

Without
EF Polymer

With
EF Polymer



EF Polymer locks in water and nutrients, releasing slowly to roots

Our Solution:

Super absorbent polymer with organic certificates across regions

JAS Organic Material Certificate (Japan)

文書番号 OM-231212
2023年11月27日

EF Polymer株式会社 ゴルジール ラル ナラヤン 様

東京都中央区京橋3丁目8番3号 竹河ビル4F
一般社団法人有機JAS資材評価協議会
代表理事 高橋 和

判定結果通知書

申請頂きました資材についての判定委員会の結果を、下記の通りご通知いたします。

記

- 登録資材名 EF ポリマー、EF Polymer、FASAL AMBT
- 商品番号 ー
- 申請者の名称・住所 EF Polymer株式会社
仲蔵県国頭郡足柄村谷案1919-1 イノベーション
スクエア インキューバー
- 申請番号 1612
- 登録番号 JASOM-230203
- 判定日 2023年11月27日
- 適合性審査結果 可

8. 適合判断基準 有機農産物の日本農林規格 別表1 畜かす類、食品工場
及び醸造工場からの農畜水産物由来の資材

※判定について異議がある場合は、所定の手続き(文書の提出)で異議申立て
することができます。また、再検査を希望する場合は、申請してください。

以上

Ecocert Organic Certificate (US, EU)

COMPLIANCE STATEMENT
N° 278164/31/07/2023/104

ECOCERT

This compliance statement is issued to the operator below audited by ECOCERT S.A.S.
EF POLYMER K.K. Company
1919-1 Tancha, Onna-son, Kunigami-gun, 9040495, Okinawa - Japan

ECOCERT S.A.S. confirms that the following products are Suitable for use in Organic Farming according to specific conditions specified in the program:
USDA NOP - INPUTS ATTESTATION

For the following products categories:
FERTILIZER AND AMENDMENT

Compliance statement issued on 11 July 2023

ECOCERT S.A.S.
BP 47 L'Écluse Lamoignon Quest - 32600 FLEUREY JOURDAIN
+33 5 62 07 34 24 - service.clients@ecocert.com - www.inputs.bio
Capital 300 000 € - TVA Intracommunautaire n° FR 76 897 812 138

This Compliance Statement is valid until 31 March 2025

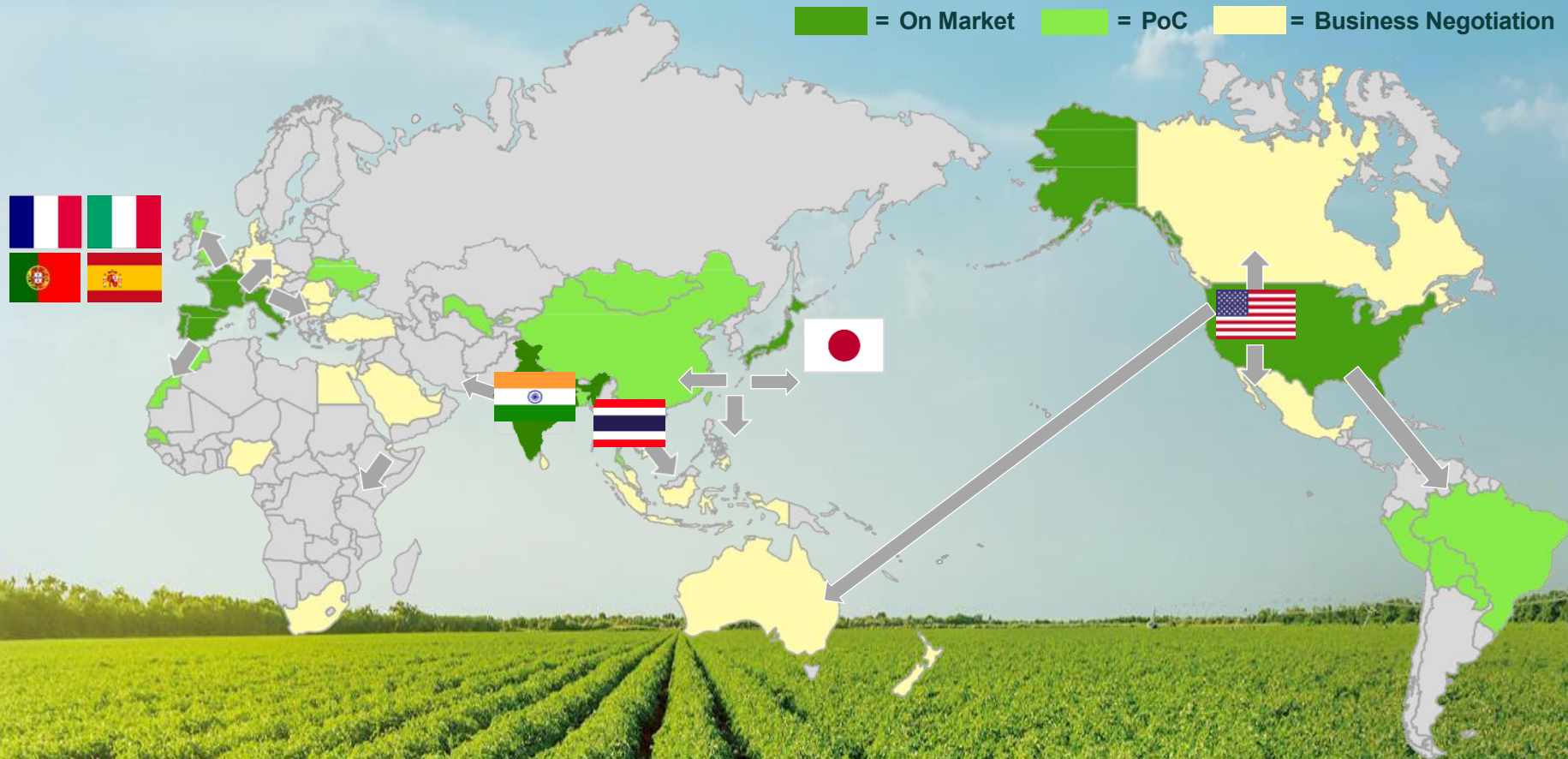
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OMRI Certificate USDA BioPreferred



BioPreferred

Sold in India, Japan, France, and the US — 800 Tons Delivered to 20,000+ Farmers since 2020. PoCs Conducted in 20+ Countries





Business Progress in India

- Listed as a recommended agricultural product by the Indian government
- 5x sales growth year-over-year, now covering 19 states in the region
- Collaboration with the Gates Foundation – Bill Gates visited EF Polymer in March 2025





Business Progress and PoCs in Japan

- Sold in all 47 prefectures
- Getting strong supports from Japan Agriculture Cooperatives
- Working with the largest Seedling Company in the world

✓ Irrigation Cost Reduction
(Rice)



✓ 20% Less Waste
(Carrot)



✓ Increase Yield
(Sugarcane)





Business Progress and PoCs in Europe

- Only applicable “Water Retention Polymer” in EU
- Credit Agricole Collaboration in France and Italy

✓ Initial Growth
(Corn)



✓ Initial Growth
(Cotton)



✓ 30% Yield Increase
(Tomato)





Project in Ukraine

- Supporting over 150 local producers suffering from water issues caused by dam collapse. Donated EF Polymer in collaboration with the Ukrainian government, U.S. government, and 50 companies in Okinawa

Collaborative project with the Ukrainian and U.S. governments



Coordinating for large-scale project development





Tree Planting Project in Senegal

- A joint project with Louga Regional Forestry Authority
- Test plots showed better moisture retention growth, while lower plant loss

Supported by

MAFF

Ministry of Agriculture,
Forestry and Fisheries

農林水産省



Demonstration Trial Overview

Conduct a 1-ha-scale reforestation trial to demonstrate the effectiveness of applying the knowledge.

Activity 1.1

Prepare & share survey plan

Activity 1.2

Start demonstration survey

Activity 1.3

Regular monitoring

Activity 1.4

Analyze monitoring results

Demonstration Survey Overview

Demonstration site

Approximately 1 ha within a public nursery managed by the Louga Regional Forest Service

Implementation method

Planting during the rainy season

Number of seedlings planted: 747 in total

Species: *Casuarina equisetifolia*, *Acacia mellifera*, *Acacia senegal*
EFP mixed into backfill soil (0 g, 10 g, 20 g)

Monitoring method

Water potential measured daily

Tree height and basal diameter measured after planting and in October and December



Casuarina equisetifolia Filao

【Selection reasons】

Common species
Easy to obtain
Track record in nearby areas



Acacia mellifera

【Selection reasons】

Drought tolerant
Easy to obtain



Acacia senegal

【Selection reasons】

Drought tolerant
Easy to obtain
Track record in inland areas



Water potential: An indicator of how easily water moves. Water moves from areas of higher potential to areas of lower potential. As soil dries, soil water potential decreases, making it more difficult for plants to absorb water.

Before traveling to the site, the planting species, spacing, planting methods, and EF Polymer application methods were discussed and agreed upon with local organizations. The following activities were then confirmed on site.

Seedling procurement

Fence installation

Procurement & placement of materials



Filao



Acacia senegal

Tree species	Remarks
Filao	Purchased
Acacia mellifera	Purchased
Acacia senegal	Provided by the Water and Forest Service



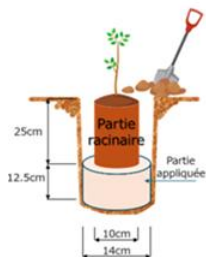
Installed a fence (H=1.5 m) to prevent damage from livestock and other animals



Planting holes were prepared in advance, and seedlings and EF Polymer were placed

Result 1:

Change in Water Potential Over Time (2024.8–2025.1)



Step 1



Step 2



Step 3



Step 4

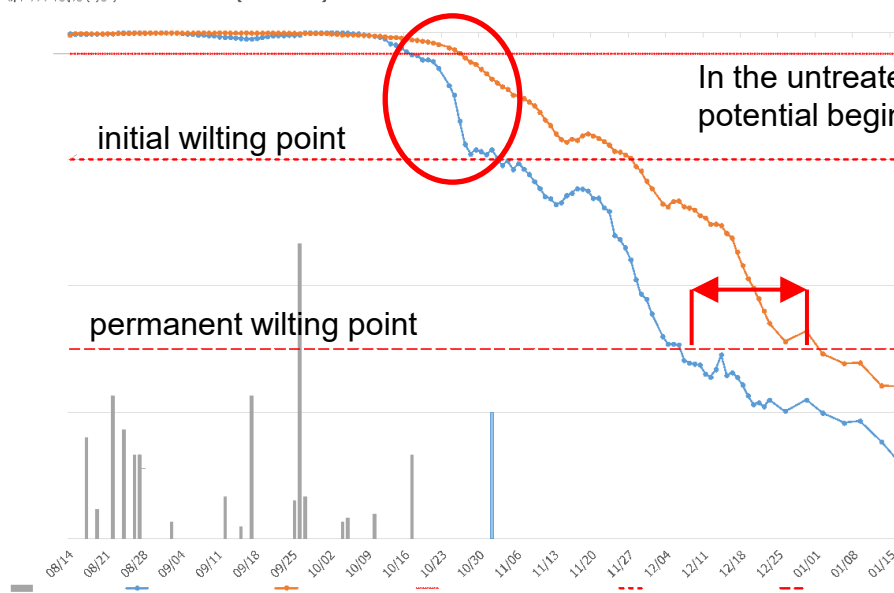


Embedded sensor



EFP mixed into the soil beneath the seedlings (0 g, 10 g, 20 g)

TEROS21 by METER was used



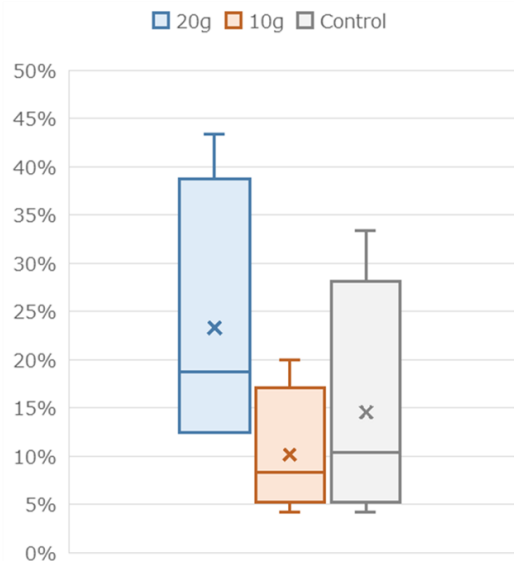
In the untreated block, the decrease in water potential begins earlier and is greater.

In the EFP-treated block, soil moisture is retained for longer, taking about one month to reach the same level of dryness as the untreated block.

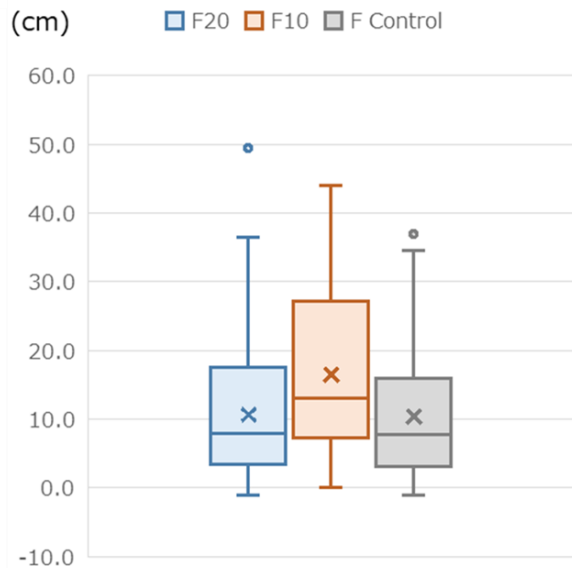
Result 2:

Growth Survey of Filao (2024.12)

Mortality rate (%)



Tree height growth (cm)



Planting:

2024/8/17

Survey:

2024/12/13

Result:

Compared with the control group, the 10 g EFP treatment tended to have a lower mortality rate and greater tree-height growth.

X: Average —: Median value



Discussion of Results

Previous studies have shown that using EFP at the time of planting can improve the growth of various tree species in India.

In this trial, a reforestation test was conducted in a low-rainfall region of Senegal (annual rainfall: 150–700 mm).

For Filao used in the trial, mixing 10 g of EFP into the soil at the bottom of the planting hole maintained a higher soil water potential, further reduced mortality, and increased growth.

These results indicate that EFP may be effective for reforestation in low-rainfall areas.

On the other hand, no significant effect of EFP was observed for Acacia species that are resistant to drought stress. There is room for further consideration regarding the amount of EFP to be used.



Beyond Agriculture

Agriculture / Horticulture



Water Retainer



Bio-Mulching

Sanitary Products



Sanitary Pad

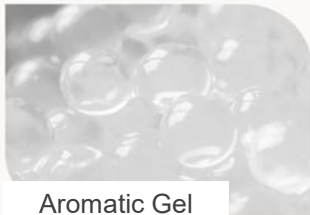


Diaper

Daily Products



Shampoo & Rinse



Aromatic Gel

Food / Distribution



Icepack Gel

Cosmetics



Cosmetics

Disaster Prevention Goods



Sandbags



Portable toilet

Pet Goods



Pet Sheet

Medical



Coagulant

Beyond Agriculture

Our Target Segment

Agriculture / Horticulture



Water Retainer



Bio-Mulching

Sanitary Products

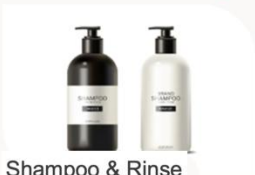


Sanitary Pad

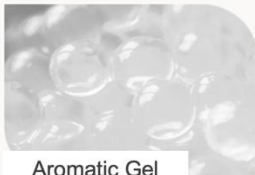


Diaper

Daily Products



Shampoo & Rinse



Aromatic Gel

Food / Distribution



Icepack Gel

Cosmetics



Cosmetics

Disaster Prevention Goods



Sandbags



Portable toilet

Pet Goods



Pet Sheet

Medical



Coagulant

Risks & Challenges

- ① **Production:**
Requires high energy resources
- ② **Use:**
Does not bio-degrade
- ③ **Disposal:**
Cause environmental pollution

Our Product Lineup

Agriculture

(for agri, horticulture, forestry)



- Absorbs 50 times vs weight
- Color: yellow
- Size: granule, micro granule

Hygiene

(for icepack, hygiene products)



- Absorbs 100 times vs weight
- Color: pale white
- Size: granule, powder

Thickener

(for cosmetic, personal care products)



- Absorbs 120-130 times vs weight
- Color: white
- Size: powder

Beyond Agriculture

Joint projects with industry leaders

Eco-Friendly Ice-Packs

EFPOLYMER x Iwatani



Biodegradable, eco-friendly

Green Cement

EFPOLYMER x cemeco®



Durability, eco-friendly

Absorption Sheet

EFPOLYMER x Soken



Biodegradable, high absorption

Cosmetic Ingredient

EFPOLYMER x

To be
Launched in
FY26



Biodegradable, unique texture

Our Main Business Locations



- Established EF Polymer America Inc. in Delaware to expand business in US
- Opened new manufacturing facility in Udaipur to increasing production capacity up to 100 tons/month



EF Polymer is Looking for Potential Partnership

Strategic Partners to Accelerate Key Initiatives

1



Upcycling Residue

Upcycling business by-products into EF Polymer

2



Cosmetic Applications

Co-development of skincare, makeup, and face masks

3



Hygiene, Personal Care Applications

Co-development of diapers, sanitary products, ice packs, and portable toilets

4



Agriculture / Greening

Collaboration in agriculture, horticulture, landscaping, urban greening, and construction



**Mother Nature Has a Solution
for Every Problem**