Datasheet

Product Overview

- **Product Name:** EF Polymer
- **Description:** EF is an eco-friendly, biodegradable polymer designed to improve water retention in soils, reduce irrigation needs, and enhance crop productivity. Tailored for sustainable agriculture, it is especially effective for tomatoes and other field crops.
- **Applications:** Ideal for both direct-seeded and transplanted tomatoes, as well as other vegetables and row crops. Suitable for water-scarce regions or areas with erratic rainfall.

Key Benefits

- Enhances soil water retention, reducing irrigation needs by up to 40%.
- Improves nutrient availability and minimizes leaching losses.
- Encourages healthy root development and boosts crop yields.
- Fully biodegradable and safe for the environment.

Technical Specifications

- **Composition:** Plant-based, organic, non-toxic polymer blend.
- **Appearance:** Fine powder or granules.
- **Water Absorption Capacity:** Absorbs up to 50x its weight in water.
- **pH Range:** Neutral (4.0 - 9.0).
- **Biodegradability:** 100% within one year under typical field conditions.

Tomato Production, Yield, and Input Efficiency

INIFAP Celaya Experimental Station, Guanajuato, Mexico (2025)

Study Overview

A field trial was conducted at the INIFAP Celaya Experimental Station in Guanajuato, Mexico, to evaluate EF Polymer performance in tomato production under varying irrigation and fertilization regimes. The study focused on determining whether EF Polymer could improve tomato productivity, fertilizer efficiency, and water-use performance under field conditions. The trial used the determinate saladette tomato variety *Pony Express* during the 2025 spring–summer production season.

Overall, EF Polymer treatments outperformed non-polymer controls in fruit number, yield per plant, bunch formation, and fertilizer efficiency. The strongest practical result was that the highest polymer treatments maintained high productivity even under reduced irrigation conditions, highlighting strong potential for water-limited tomato production systems.

1. Trial Overview

Background

Tomato production in semi-arid regions such as the Bajío region of Mexico depends heavily on efficient irrigation and fertilizer management. Increasing water scarcity and rising fertilizer costs create a strong need for technologies that improve resource-use efficiency while maintaining crop productivity.

EF Polymer is a biodegradable superabsorbent polymer designed to improve soil moisture retention, reduce nutrient leaching, and buffer crops against short-term water stress.

Objectives

1. Evaluate the impact of EF Polymer on tomato growth and yield under different irrigation and fertilizer regimes.
2. Assess EF Polymer's role in improving water productivity and fertilizer efficiency.
3. Determine whether reduced irrigation strategies can maintain productivity when combined with EF Polymer.

2. Experimental Design and Treatments

- **Design:** 3k factorial experimental design
- **Replications:** 2
- **Total treatment combinations:** 16
- **Experimental unit:** Two beds per repetition
- **Bed dimensions:** 60.25 m × 1.6 m
- **Plants per bed:** 172
- **Plants per plot:** ~236 sampled plants

Treatment Summary

Treatment	Polymer Rate	Irrigation Level	Description

C1	0	80%	75%
C2	0	100%	100%
C3	15 kg/ha	80%	75%
C4	15 kg/ha	100%	100%
C5	20 kg/ha	80%	75%
C6	20 kg/ha	100%	100%
C7	30 kg/ha	80%	75%
C8	30 kg/ha	100%	100%

3. Field Operations and Polymer Application

Field preparation followed standard INIFAP production practices. Beds were formed and equipped with drip irrigation prior to transplanting. EF Polymer was mixed with solid fertilizer and incorporated into the soil before transplanting.

The 30 kg/ha treatment corresponded to approximately 0.92 g of EF Polymer per linear foot of bed. Drip irrigation was used throughout the study with treatment-specific irrigation levels (75% and 100%). Tomato transplants were successfully established across all plots with uniform stand establishment. The polymer-fertilizer mixture was band-applied within the active root zone to improve water and nutrient retention near developing roots.

4. Data Collection

Agronomic Measurements

- Plant height
- Stem diameter
- Number of bunches per plant
- Number of fruits per plant

Productive Measurements

- Yield per plant
- Yield per hectare
- Water productivity
- Fertilizer-use efficiency

Fruit Quality Measurements

- Individual fruit weight
- Polar and equatorial fruit diameter
- pH
- °Brix
- Firmness
- Shelf life

5. Results

5.1 Plant Growth and Fruit Production

EF Polymer treatments generally produced larger plants with greater stem diameter and more bunches per plant compared to controls. The strongest growth responses were observed in C4, C5, C6, and C8 combinations under full irrigation.

Key Takeaways

- C8 treatments produced the highest fruit numbers under both irrigation regimes.
- C8 exceeded the controls by more than 15 fruits per plant.
- C6 and C8 produced the highest number of bunches per plant.
- Polymer treatments improved overall plant vigor compared to controls.

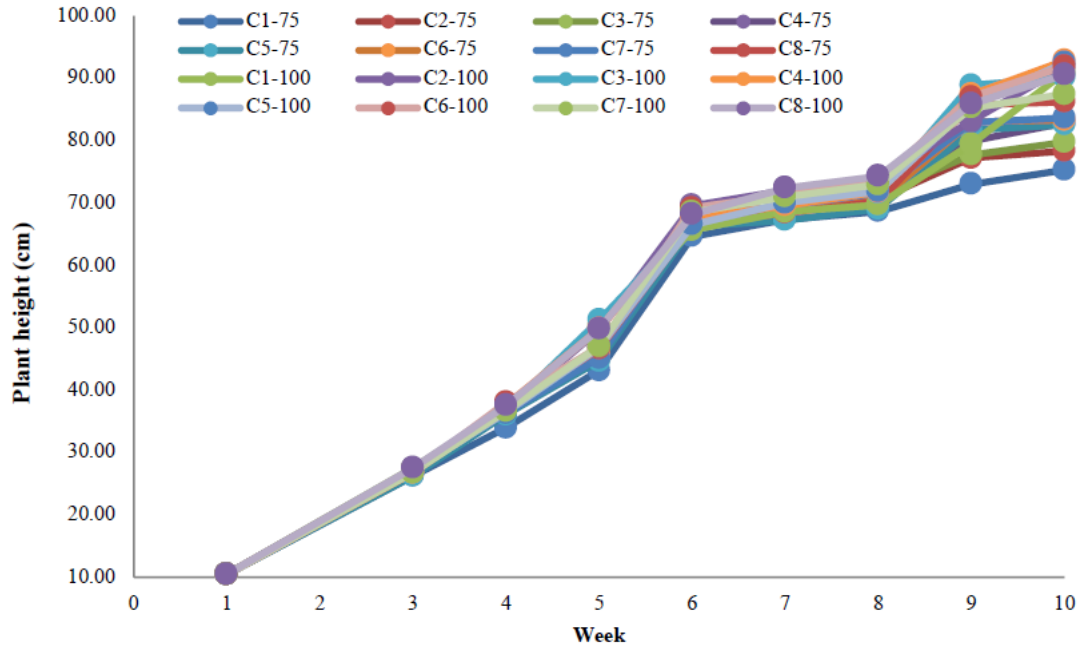

Figure 4. Plant height progression across irrigation and polymer treatments during the growing season.

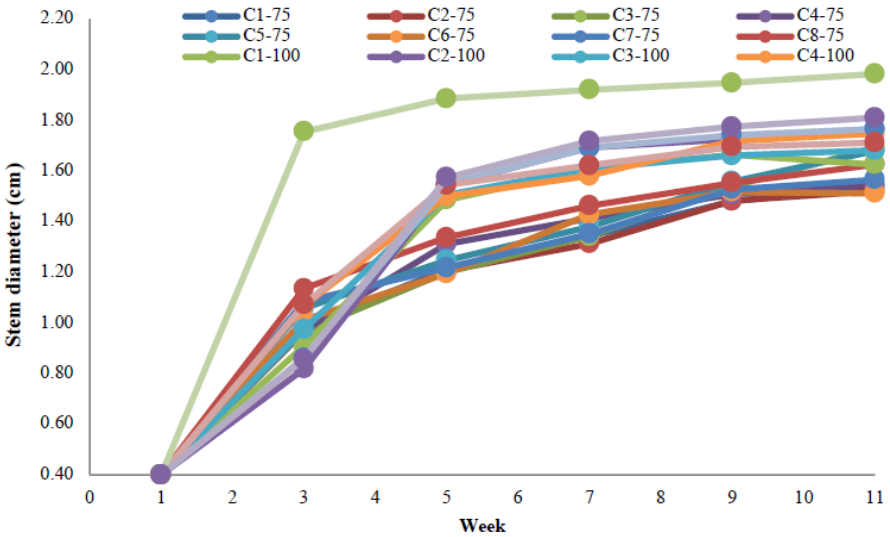

Figure 5. Stem diameter development under different polymer and irrigation combinations.

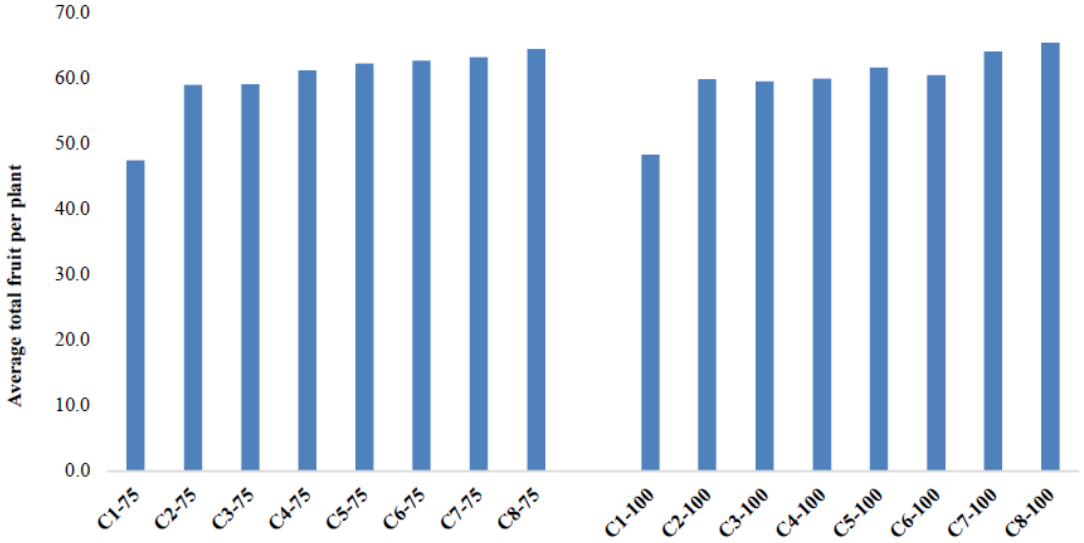

Figure 6. Average total fruit number per plant across treatments.

5.3 Yield Per Plant and Yield Per Hectare

Yield increased progressively with polymer rate.

The highest-performing treatment was:

- **C8-100** (30 kg polymer + 100% fertilizer + 100% irrigation)

This treatment achieved:

- **6.98 kg fruit per plant**
- **160.5 t/ha yield**

Compared with:

- **128.1–130.9 t/ha** in control treatments.

Key Takeaways

- EF Polymer increased yield by approximately **18.5%** compared to controls.
- C8-75 performed similarly to C8-100 despite reduced irrigation.
- C6-100 and C8-75 achieved yields statistically similar to the highest treatment.
- These results suggest EF Polymer may help sustain high tomato yields while reducing irrigation inputs by approximately 25%.

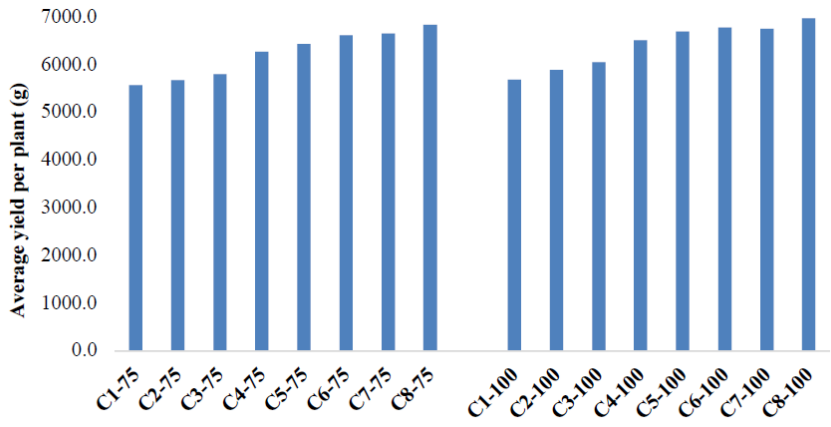

Figure 7. Average fruit yield per plant across polymer, fertilizer, and irrigation treatments.

5.4 Fruit Quality

Fruit quality traits were not negatively affected by EF Polymer application.

Key Findings

- Individual fruit weight remained consistent across treatments.
- Fruit diameter was unaffected by polymer application.
- pH, °Brix, firmness, and shelf life remained stable.
- Average shelf life was approximately 20 days.

EF Polymer improved productivity without compromising market quality or postharvest performance.

6. Conclusion

The INIFAP Celaya tomato trial demonstrated that EF Polymer improved tomato growth, yield, and fertilizer-use efficiency under drip-irrigated field conditions in Mexico.

The highest-performing treatment (30 kg polymer + 100% fertilizer + 100% irrigation) produced the greatest yield; however, the corresponding reduced-irrigation treatment achieved statistically similar performance, supporting EF Polymer's potential as a practical water-saving technology.

Overall, EF Polymer shows strong potential to improve productivity and input-use efficiency in tomato production systems, particularly under moderate irrigation reduction strategies.