

## Breaking Down Polystyrene—One of Nature's Most Challenging Plastics! Discovery of Multiple Bacterial Strains That Degrade PS Containing the P-Life Additive

A research team consisting of **P-Life Japan Inc.** (President: Isao Toyama, Head Office: Setagaya-ku, Tokyo), Keio University (President: Kohei Itoh, Location: Minato-ku, Tokyo), Ito En, Ltd. (President: Daisuke Honjo, Head Office: Shibuya-ku, Tokyo), SI Resin Industry Co., Ltd. (President: Nobuyuki Sakashita, Head Office: Makinohara City, Shizuoka), Keio Leading-Edge Laboratory of Scientific and Technology (Director: Hiroyuki Tsuda, Location: Yokohama City, Kanagawa), and Shonan Trading Co., Ltd. (President: Norio Hashimoto, Location: Yokohama City, Kanagawa) has successfully acquired **decomposition bacteria** suitable for **Polystyrene (hereinafter PS) containing the additive P-Life**. This additive imparts **biodegradability to plastics**.

### RESEARCH FINDINGS

This achievement marks an important step toward realizing **microbial decomposition treatment for PS**, a **styrene-based plastic** that is **persistent (difficult to decompose)**. Furthermore, these decomposition bacteria are expected to be effective in the **decomposition and removal of microplastics** generated from styrene-based plastics.

### PRINCIPAL RESEARCHERS

Shiori Takei (Department of Biosciences and Informatics, Faculty of Science and Technology, Keio University), Ying Huang (Researcher, Keio Leading-Edge Laboratory of Scientific and Technology), Prof. Kenji Miyamoto (Department of Biosciences and Informatics, Faculty of Science and Technology, Keio University), **Isao Toyama (P-Life Japan Inc.)**, Yoshito Abe (SI Resin Industry Co., Ltd.), Shuji Uchiyama (Ito En, Ltd.), Norio Hashimoto (Shonan Trading Co., Ltd.)

### PRESENTATION DETAILS

These results will be presented at the **2026 Annual Meeting of the Japan Society for Bioscience, Biotechnology, and Agrochemistry** in Kyoto. The meeting will be held on March 10, 2026.

WhatsApp: +52 1 33 3841 6195  
 info@p-lifejapan.com  
 www.p-lifejapan.com



## KEY POINTS OF THIS RESEARCH

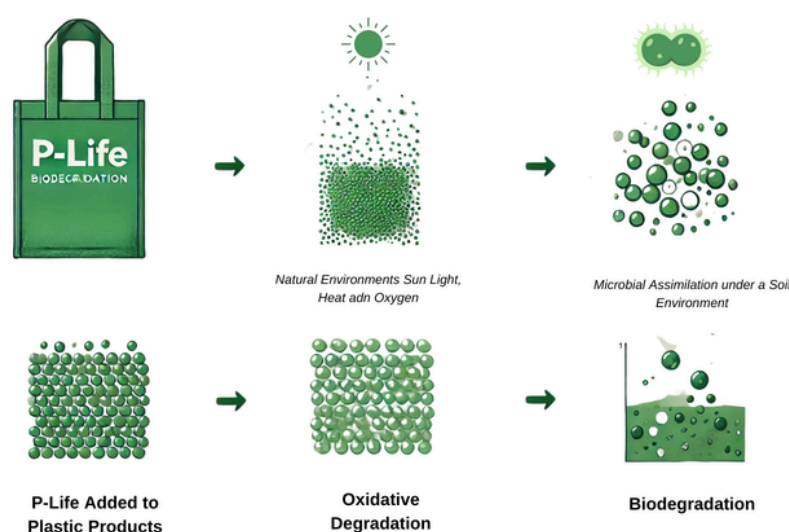
- Discovered multiple bacteria strains capable of decomposing P-Life-containing PS.
- Observed clear decomposition traces when these bacteria were applied to P-Life-containing PS.
- Found that these bacteria also decompose UV-treated P-Life-containing PS.

## RESEARCH BACKGROUND

In recent years, the leakage and accumulation of plastic in the environment has become a major social issue. Among these, PS, a type of polyolefin-based plastic widely used in food containers, is **extremely difficult to biodegrade in the natural environment**. Under these circumstances, **President Toyama** of our company developed "P-Life." This is a revolutionary additive that imparts **biodegradability to polyolefin-based plastics**.

It was already known that P-Life gradually transforms PE (Polyethylene) and PP (Polypropylene) into **low-molecular-weight compounds with functional groups**. These low-molecular-weight compounds are slowly metabolized and decomposed by **microorganisms living in the natural environment**. We previously announced our success in acquiring decomposition bacteria for these materials.

However, regarding PS containing P-Life, it was completely unknown whether it would decompose in the natural environment. Therefore, in this study, we succeeded in isolating **decomposition bacteria for the first time**. This was achieved by optimizing the search sources and separation conditions.



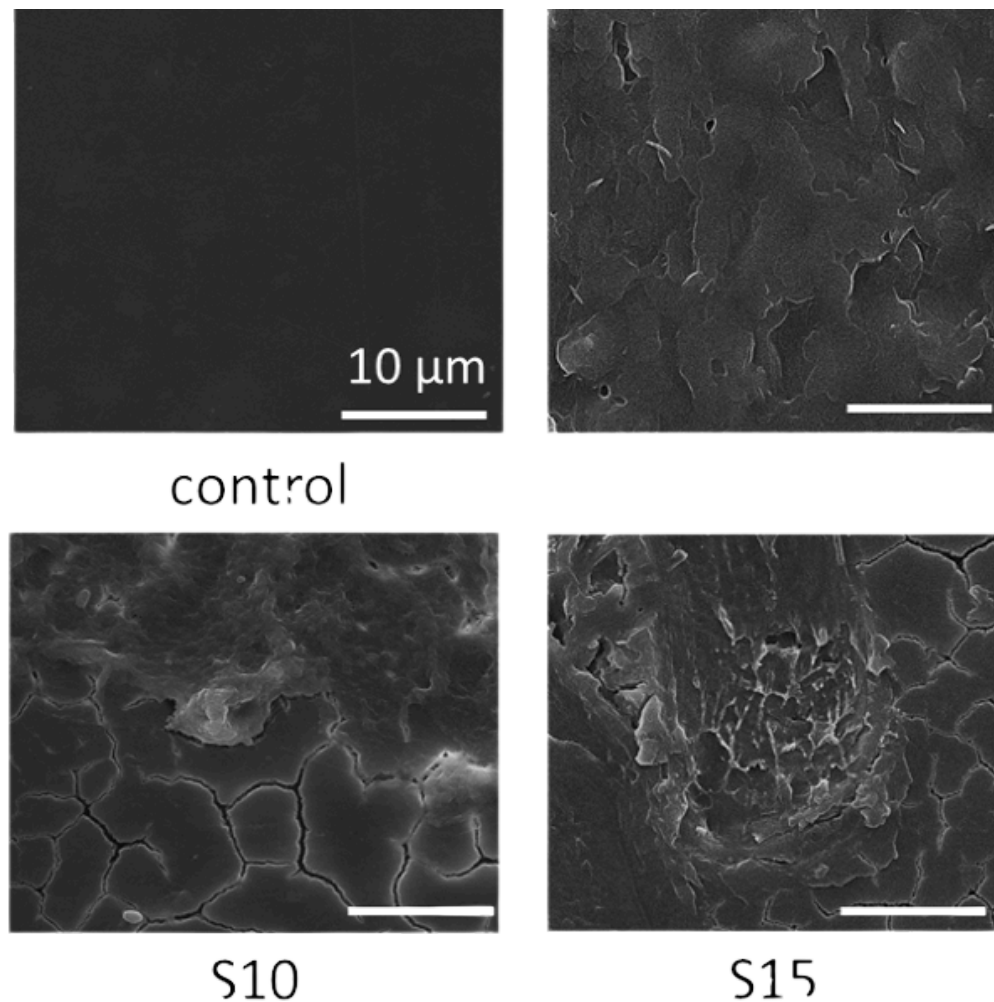
WhatsApp: +52 1 33 3841 6195  
 info@p-lifejapan.com  
 www.p-lifejapan.com



**P-Life**®

## RESEARCH CONTENT & RESULTS

In this study, focusing on the P-Life-containing plastic decomposition bacteria we had already acquired, we searched among these for strains that would decompose **P-Life-containing PS sheets**. As a result, three strains—T6-1 (*Cupriavidus* sp.), S10, and S15 (both *Bacillus* sp.)—were found to **significantly decompose P-Life-containing PS sheets**.



**Figure 1:** Decomposition traces on P-Life-containing PS sheets by T6-1, S10, and S15.

WhatsApp: +52 1 33 3841 6195

info@p-lifejapan.com

www.p-lifejapan.com



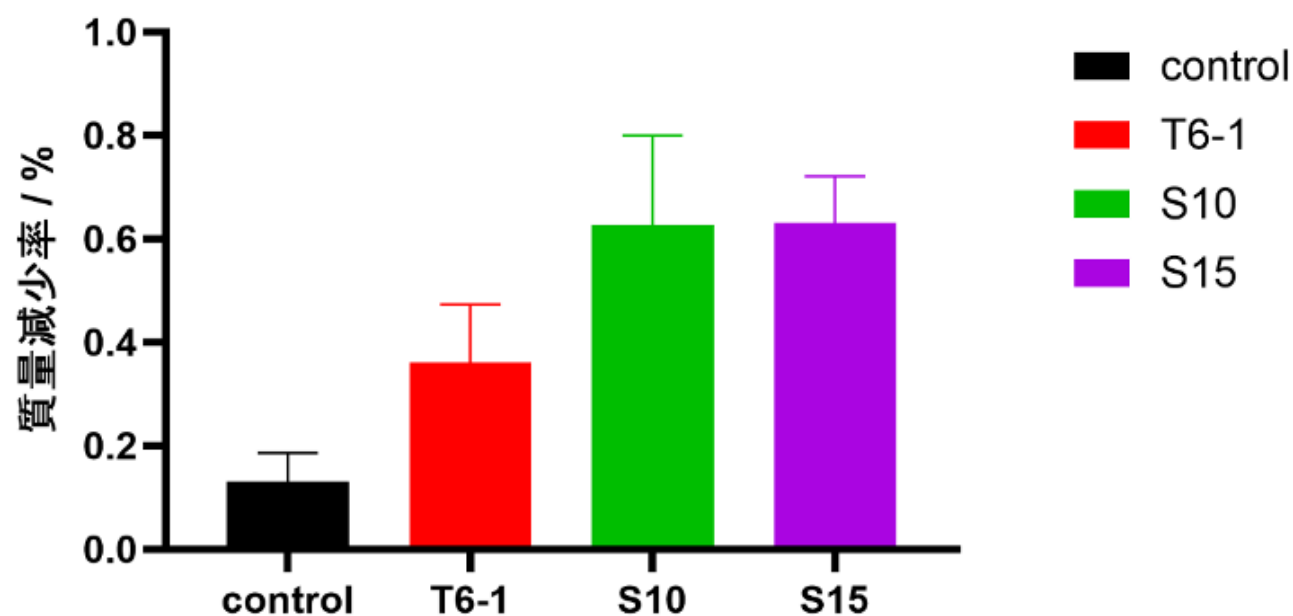


Figure 2: Mass reduction rate of P-Life-containing PS sheets by T6-1, S10, and S15.

Furthermore, it was revealed that the **decomposition efficiency** was enhanced by subjecting the PS sheets to **UV treatment**.

## FUTURE PROSPECTS

We have discovered decomposition bacteria for **P-Life-containing PS** and revealed that they possess **high decomposition capabilities**. By combining the decomposition bacteria identified in this result with P-Life, **a drastic improvement in the decomposition efficiency of PS becomes possible**. These decomposition bacteria are expected to make a significant contribution toward **solving the problem of persistent plastics**.

WhatsApp: +52 1 33 3841 6195

info@p-lifejapan.com

www.p-lifejapan.com



## CONFERENCE PRESENTATION INFORMATION

### Event:

2026 Annual Meeting of the Japan Society for Bioscience, Biotechnology, and Agrochemistry

### Date / Venue:

March 10, Doshisha University, Imadegawa / Muromachi Campus

### Title:

*Search and Evaluation of Decomposition Bacteria for P-Life-containing PS*

### Presenters:

Shiori Takei | Ying Huang | Isao Toyama

Yoshito Abe | Shuji Uchiyama | Norio Hashimoto | Kenji Miyamoto

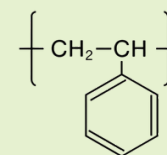
### Research Funding:

This research was supported by the JST Program on Open Innovation Platform with Enterprises, Research Institute and Academia (COI-NEXT), Grant Number JPMJPF2111.

### Term Explanations:

**P-Life:** A revolutionary additive that guides *persistent plastics*, which are considered difficult to biodegrade, toward *microbial decomposition*. Persistent plastics are transformed by P-Life into *low-molecular-weight compounds* possessing *functional groups*, making them easier for *microorganisms* to decompose. Furthermore, P-Life is manufactured from plant oil and is highly safe. Also, P-Life does not affect the *physical properties* or *processability* of PP and PS.

**Styrene-based plastics:** A general term for high-molecular compounds synthesized using aromatic hydrocarbons as monomers. A representative example is *Polystyrene (PS)*. Generally, *biodegradation* by *microorganisms* is difficult.



WhatsApp: +52 1 33 3841 6195

info@p-lifejapan.com

www.p-lifejapan.com

### Contact Information regarding this release:

**Regarding Research Details:** Prof. Kenji Miyamoto Department of Biosciences and Informatics, Faculty of Science and Technology, Keio University TEL: 045-566-1786 | E-mail: kmiyamoto@bio.keio.ac.jp

**Regarding the Release in General:** Keio University Public Relations Office TEL: 03-5427-1541 | E-mail: m-pr@adst.keio.ac.jp

P-Life Japan Inc. TEL: 03-3705-7284 | E-mail: info@p-lifejapan.com

