

**SOCAR Türkiye R&D**  
**Wastewater-Focused**  
**Environmental and Biotechnology**  
**Projects**  
**2023**

## **Reducing Environmental Impact Through Biotechnological Treatment of Propylene Glycol-Containing De-Icing Wastewater**

A biotechnological solution was developed to reduce the environmental impact of de-icing fluids containing propylene glycol. Within this project, wastewater generated after anti-icing processes on aircraft was biologically treated. Thanks to the specialized bacterial cultures developed in this project, chemical oxygen demand (COD) was reduced, thereby preventing water pollution and creating a valuable know-how. The bacteria were selected by isolating them from naturally occurring species, which increased the efficiency of these processes and minimized the negative effects on the ecosystem. Studies on field applicability and economic feasibility are still ongoing. This solution has made significant contributions to the protection of water resources and the reduction of carbon footprint.

## **Biological Treatment of Phenolic and Nitrogen Compounds in STAR Refinery Wastewater**

Different projects were completed to biologically treat phenolic and nitrogen/nitrile compounds found in wastewater from the STAR Refinery wastewater treatment plant. A mixture of bacteria capable of using phenol as the sole carbon source was developed. Successful results were obtained from trials conducted in refinery wastewater and Petkim biological ponds, and the nitrogen product was elevated to Technology Readiness Level (TRL) 9. These efforts are considered a significant step towards environmental sustainability and industrial applications.

## **Locally Produced Long-Shelf-Life Dry Bacterial Cultures for Petrochemical Wastewater Treatment**

Locally produced dry bacterial cultures with a long shelf life have been developed for the treatment of petrochemical wastewater. These cultures eliminate dependence on expensive imported bacteria, providing a cost advantage through local production and enhancing treatment efficiency by accelerating adaptation processes. Additionally, the know-how gained from large-scale production and shelf-life studies of these bacteria will make product transfer easier and more economical. This project is significant both in Turkey and in international markets for the development of environmentally friendly technologies and achieving economic sustainability goals."




## **Treatment of High-Concentration Wastewaters from the Petkim ACN Plant Using Cold Plasma and Wet Air Oxidation**

In two different projects conducted at the Petkim ACN Plant, we aimed to treat high-concentration wastewater from the C-101 column using Cold Plasma (CP) technology and Wet Air Oxidation (WAO) method. Operational evaluations and trials are ongoing, with various application methods being explored for integration into production processes. Based on the technical information obtained, a patent application has been filed. These efforts are crucial in our pursuit of developing eco-friendly and cost-reducing innovative solutions, contributing to our sustainability goals such as energy conservation and improved waste management.

## **Investigation of Alternative Chemicals to Caustic for Wastewater Neutralization at Petkim and Star Refinery**

Another project has been undertaken to investigate more efficient and cost-effective alternative chemicals to replace caustic in the neutralization processes of wastewater treatment facilities at Petkim and Star Refinery. In line with sustainability and cost-saving objectives, it has been determined that these alternatives offer significant long-term savings potential.





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