Recycled plastic production
A Mellifiq reference project

Closing the Plastic Loop Through Efficient Washing

AxoPlus® technology enables closed-loop washwater system for high-quality recycled plastic production

MELLIFIQ

Plastic recycling, Sweden

In this project, we are collaborating with a company in the plastics industry that offers a sustainable and competitive alternative to virgin plastic through innovative technology, while upholding high commercial and environmental standards. The company operates independently, without ties to any specific industry interests. The process involves collecting plastic waste from households, breaking it down into smaller fragments, thoroughly cleaning the material, and converting it into plastic pellets, which are then used to manufacture new products.

Facts

Location :	Sweden
Application	Removal of suspended solids, phosphorus and emulsified oil
Industry:	Plastic recycling

Solution:

Mellifiq delivery:	AxoPlus system including AxoPur reactors with hydraulic capacity 20 m³/h each, partly for redundancy and a flotation unit
Capacity:	40 m³/h
Reduction of:	Suspended solids 90 %, Phosphorus 75%, Chemical oxygen demand (COD_{Cr}) 50 %

The problem

The societal benefits of recycling should be evident to everyone. In the case of plastics, recycling is particularly critical, as the alternative involves more than just the loss of material.

Plastics spread in nature get fragmented rather than (bio-)chemically degraded adding to the spread of microplastics sooner or later reaching rivers, lakes and the sea. Microplastics are defined as plastic particles in the size range from 0.1 µm up to 5 mm meaning that the numbers will increase exponentially as the fragmentation proceeds.

Recycling plastics might appear straightforward: collecting used plastics, melting them down, and producing new pellets. While this method can generate plastic pellets suitable for low-grade products like garden furniture planks, it falls short of being considered true recycling.

The market demand for such products is limited, and producing high-quality plastic pellets requires thorough cleaning of the used plastics. This presents a particular challenge, as plastic is naturally resistant to water. The simplest solution is to select plastic waste that is relatively clean from the outset. For the plastic recycling loop to be fully closed, it is necessary to recycle even the more contaminated fractions of plastic.

Household plastics are among the most contaminated plastic fractions and act as the raw material in our client's mill. From the beginning, the mill selected chemical coagulation as the method for treating the used washwater. However, the washing results did not meet the required standards. In addition, the plant faced several serious issues concerning occupational health and safety. No high-grade plastic pellets could be produced unless the washing was significantly improved.

The solution

The company sought a solution to their washwater treatment issues through our expertise. A new purification system, based on Axolot technology, was developed to tackle their washwater challenges. In addition to the system design, comprehensive expert guidance on various operational aspects of the mill was provided throughout the duration of the project.

The AxoPlus system was designed with two parallel reactors to provide redundancy. The system was set to operate in a near to closed loop where the purified washwater was reused as new washwater. The contaminants were removed in a compact floc to be incinerated at a local waste incineration combining heat and power plant. When newly collected household plastic waste was used as feedstock the mill proved able to produce high-grade recycled plastic pellets.

Evaluation

The AxoPlus system was capable of treating 40 m³/h of washwater, achieving a significant reduction in suspended solids (90%), phosphorus (75%), and chemical oxygen demand (50%). This solution not only improved the quality of the recycled pellets but also addressed health and safety concerns while ensuring a more sustainable and efficient recycling process.

The AxoPlus electrocoagulation system efficiently removed contaminants, forming a compact floc that is subsequently incinerated at a local waste disposal facility.

The technology enabled the mill to successfully process household plastic waste into high-quality recycled plastic pellets.

The AxoPlus system was installed, tailored to meet the unique requirements of the location and purpose.

About Mellifiq

Mellifiq is a multi-awarded environmental service company group, that has since the early nineties evolved into a world leading system and solution provider with multiple groundbreaking applications for industrial, municipal, and real estate clients. We supply cutting-edge technologies to manage the most sophisticated air, water, and energy challenges.

Mellifiq offers a complete range of air and water treatment technologies and solutions across multiple industries such as processing industry, energy sector, food and beverage, pharmaceutical, wastewater treatment and commercial real estate.

Mellifiq offers strong and renowned brands, such as Ozonetech, Nodora and Water Maid, and world-class engineering services combined an excellent track record of more than 40 years of innovation. We help our clients achieve the most efficient and sustainable solutions while creating the maximum value for their businesses.

With several business units across Europe, Mellifiq is headquartered in Stockholm where research and development, production, QA and certification all take place. Our unique technology and our extensive expertise have made us the Center of Excellence for the world's most complex projects, and a global player with installations on all six continents.

Everyday millions of people rely on our solutions for ventilation, disinfection, sanitation, and odor control. We are committed to raising the bar for the concept of clean and the industry standard for engineering, technical services and general contracting.

For additional information, visit our website at www.mellifiq.com

MELLIFIQ

+ 46 10 252 30 00 Elektravägen 53, SE-126 30 Hägersten, Sweden www.mellifiq.com