

Production of Bio-Super Absorbent Polymers from Cellulose

Advanced Biorefinery Technologies Ltd

Advanced Biorefinery Technologies Ltd. introduces Bio-Super Absorbent Polymers (Bio-SAPs), a sustainable and innovative solution designed to address water management challenges across various industries. Derived from lignocellulosic biomass, Bio-SAPs offer exceptional water absorption and retention capabilities, combined with biodegradability and reusability, making them a superior alternative to traditional petroleum-based SAPs.

How It Works

The production of Bio-SAPs involves a multi-step process:

Pre-Treatment of Biomass

Agricultural residues or forestry byproducts rich in cellulose are pre-treated to separate lignocellulose components.

Fractionation and Purification

The cellulose is fractionated and purified to ensure high-quality feedstock for polymer synthesis.

Modification and Functionalization

The cellulose undergoes chemical modifications, introducing functional groups to enhance its water absorption capacity and thermal stability.

Co-Polymerization

The modified cellulose is co-polymerized to create a super absorbent structure with excellent retention and biodegradability characteristics.

Key Features and Advantages

Superior Water Absorption:

Absorption capacity ranges from 400–600 times its weight in water, making it ideal for water-intensive applications.

Biodegradability and Sustainability:

Produced from renewable lignocellulosic biomass, Bio-SAPs are biodegradable and reduce environmental impact compared to petroleum-based SAPs.

High Thermal and Chemical Stability:

Performs reliably across a wide temperature range and is stable in various pH conditions, ensuring versatility in applications.

Reusability:

Maintains its water absorption capacity even after multiple use cycles, reducing material costs and waste.

Applications

Agriculture:

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Acts as a soil conditioner, improving water retention in arid and drought-prone regions, enhancing crop yield and reducing irrigation needs.

Hygiene Products:

Used in diapers, adult incontinence products, and feminine hygiene products for superior absorption and leak prevention.

Medical and Healthcare:

Applied in wound dressings and medical pads for moisture management and comfort.

Industrial Use:

Suitable for controlling water leaks, spillage management, and environmental remediation.

Sustainability Impact

Bio-SAPs significantly reduce the reliance on non-renewable, petroleum-based polymers and offer a circular solution for water management. Their biodegradability ensures minimal environmental footprint, aligning with global sustainability goals to reduce plastic pollution and improve resource efficiency.

Why Choose Our Bio-SAPs?

Eco-Friendly Innovation: Bio-SAPs are a green alternative to traditional SAPs, designed for long-term environmental and economic benefits.

Versatile and Effective: Adaptable to a wide range of applications, from agriculture to healthcare.

Cost-Effective: Reusable and efficient, reducing long-term costs for industries and consumers.

By combining advanced biorefinery technology with a focus on sustainability, our Bio-SAPs are paving the way for eco-friendly water management solutions that benefit both industries and the environment.



Fig. 1 Production Process of Bio-Super Absorbent Polymers (Bio-SAPs)