MAKING LEVULINIC ACID HAPPEN

GFBiochemicals - bringing biobased levulinic acid to market through technology innovation

Levulinic acid offers a more sustainable solution for chemicals and biofuels. GFBiochemicals makes it directly from biomass which allows for a fundamentally lower price range compared to existing processes.

Levulinic acid development since 2008

GFBiochemicals started commercial production in 2015, making its commercial-scale levulinic acid plant the world's largest. It will scale up to full capacity of 10,000 MT/a by 2017.

Because of GFBiochemicals' flexibility in inputs, its levulinic acid is produced from abundant renewable feedstock and is a cost-competitive replacement for petroleum-derived chemicals.

GFBiochemicals looks to expand its product portfolio to include additional value-added levulinic acid derivatives. These will be developed and produced at the company's production site to accelerate downstream market introduction.

GF Biochemicals™ THE LEVULINIC COMPANY

ATLAS™ TECHNOLOGY

Segetis™ BIO-PERFORMANCE PRODUCTS

Javelin™ TECHNOLOGY

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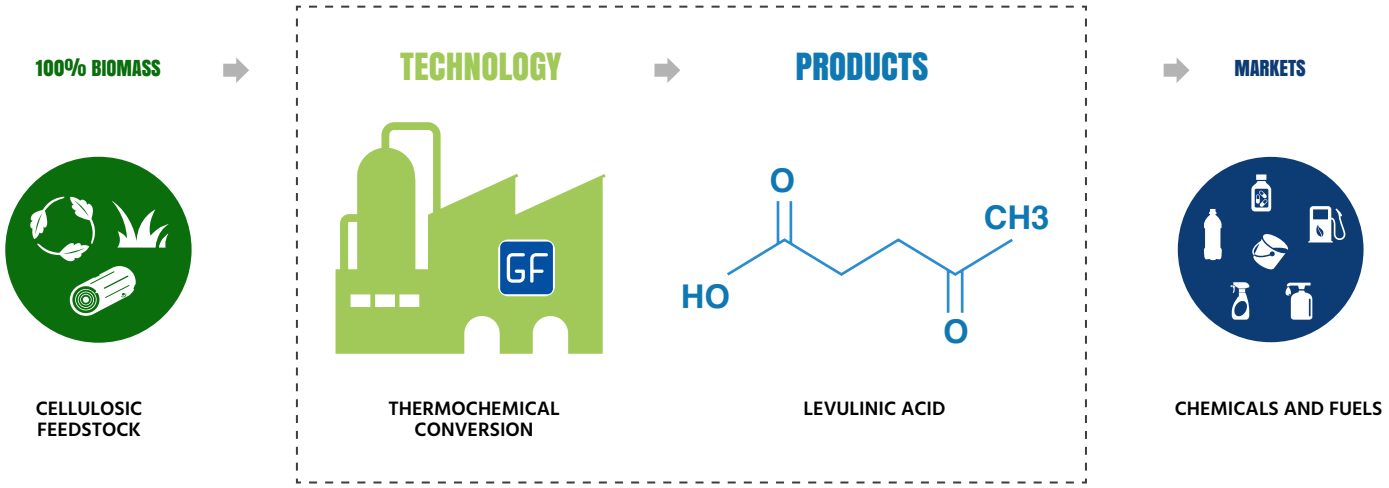
THE BUILDING BLOCK FOR A GREEN FUTURE

Market Potential

Levulinic acid was recognized by the US Department of Energy as one of the top biobased building block chemicals of the future.

As the world moves from fossil-based to alternative feedstock, levulinic acid serves as an incredibly versatile building block for chemicals and materials. The platform chemical successfully addresses many performance-related issues attributed to fossil-based chemicals and materials.



MARKET SEGMENTS

> Solvents
> Resins and coatings
> Polymers and plasticizers
> Flavors and fragrances
> Personal care
> Pharmaceuticals
> Agrochemicals
> Fuel additives

MARKET APPLICATIONS

> Green solvents
> Biobased detergents
> Biopolymers
> Biodegradable plasticizers
> Biobased resins
> Biofuels

VALUE-ADDED PRODUCTS

> Levulinate esters
> Gammavalerolactone (GVL)
> Methyltetrahydrofuran
> Diphenolic acid
> Delta-amino levulinic acid