



SUGAR ENERGY

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BIO-BASED PRODUCTS FROM SUGAR ENERGY
ARE GREEN AND SUSTAINABLE



SUGAR ENERGY

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Common Pursuit, Common Dream,
Common Efforts
For Common Prosperity

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FOR A BETTER FUTURE

ABOUT SUGAR ENERGY

SUGAR ENERGY FOR A BETTER FUTURE



VISION
A CLEANER EARTH BECAUSE OF SUGAR ENERGY



MISSION
CREATE DISRUPTIVE NEW TECHNOLOGIES, NEW BIO-BASED MATERIALS, AND A NEW GLOBAL PLATFORM



VALUES
SCIENCE AND TECHNOLOGY AS THE BASE
RESPONSIBILITY AS THE PRIORITY
INNOVATION AS THE KEY
DREAM AS THE ENGINE

COMPANY PROFILE

8⁺ years
R & D Experience

10^x
Sales Growth

80⁺ %
HMF Market Share

Founded in 2017, Zhejiang Sugar Energy Technology Co., Ltd. is a national high-tech enterprise co-founded by Ningbo Institute of Materials Technology & Engineering, CAS. We are mainly engaged in the original design, development, production and application promotion of new bio-based materials. We creatively apply "advanced catalytic and molecular design technologies" to the production of furan derivatives and its end products. Our products are mainly for bio-based engineering plastics, special fibers, bio-pharmaceutical, fine chemicals, clean oils, degradable plastics and other fields.

We are innovation-driven and committed to the innovative application of bio-based materials, as well as the development and transfer of core patented technologies 5-hydroxymethylfurfural (HMF) and 2,5-furandiformic acid (FDCA). We

insist on developing products from biomass to polyesters (including monomers) and stick to the goal of product diversification and industry chain development to apply our products in various sectors of China's national economy.

We regard environmental and ecological responsibility as our priority. We are committed to providing unique technological solutions to reduce the global emissions of plastic waste and move towards a circular, sustainable bio-based economy in response to climate change.

Our mission is to "create disruptive new technologies, new bio-based materials, and a new global platform". Our lofty goal is to create "a cleaner earth because of Sugar Energy". We seize the day to strive for a clean, environment-friendly, healthy, sustainable future!

AWARD & PATENT CERTIFICATES



TECHNICAL ADVANTAGES

Sugar Energy Company has rich experience and technical accumulation in the design and development of new bio-based furan-based materials. It introduces various functional groups through substitution, addition, hydrogenation, oxidation, polymerization and other processes to produce products with special structures and properties, Special chemical products that can be used in many areas of the national economy.

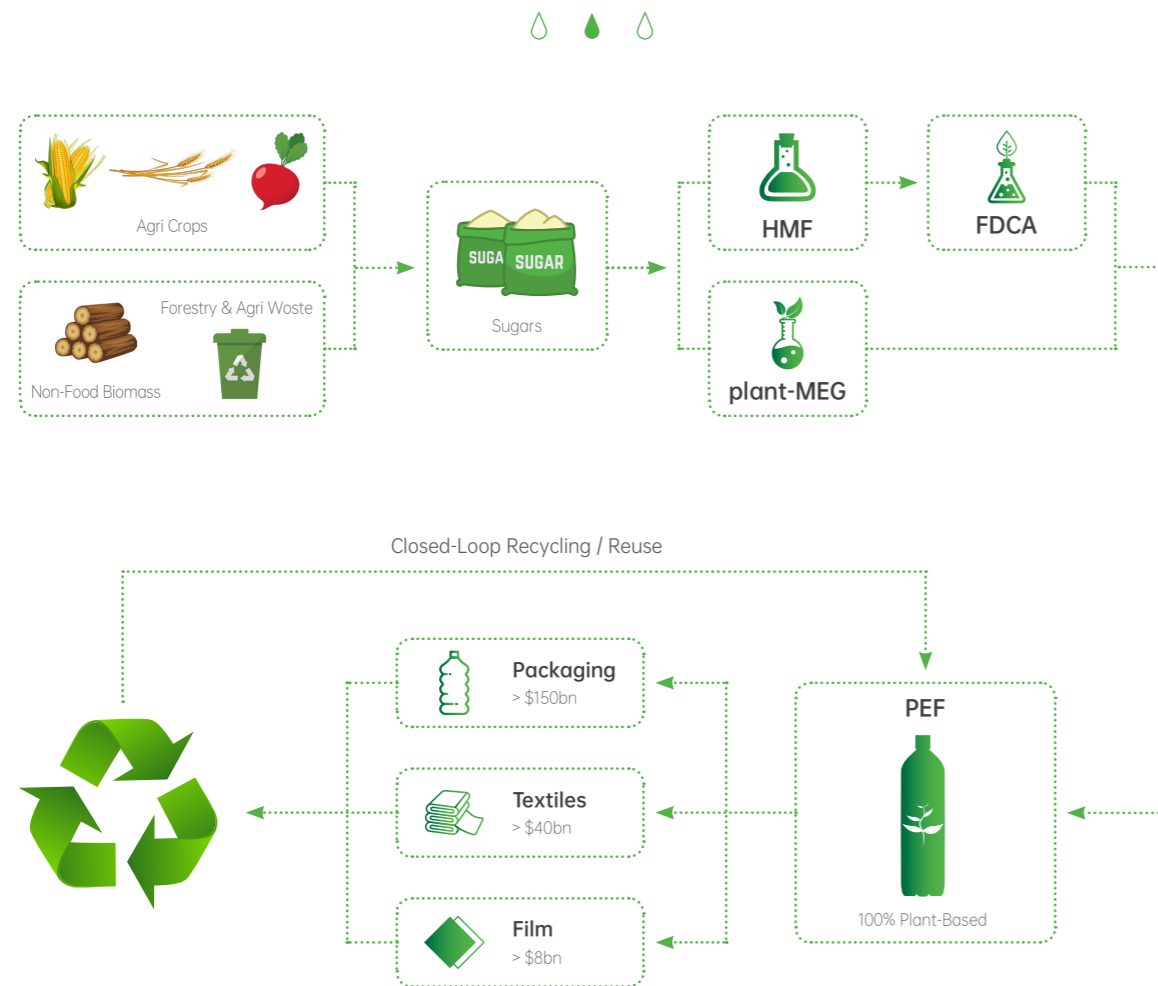
PRODUCTION CAPACITY

"WE SEEK PROGRESS IN STABILITY"

TO ENHANCE OUR COMPREHENSIVE PRODUCTION CAPACITY



PEF INDUSTRY CHAIN ANALYSIS



OUR MAIN BUSINESS LINE REMAINS UNCHANGED

We are the first in the world to clear technical hurdles for 1,000t industrial production of HMF from fructose. The 100t HMF production line in Taizhou has been in stable operation for a year. The 1,000t production line in Daishan County, Zhoushan City, is going into operation. While improving HMF product quality, we will increase our production capacity to more than 3,000t/year.

MULTIPLE MEASURES ARE TAKEN TO INCREASE PRODUCTION CAPACITY

After the FDCA pilot test in 2021, we have enhanced our FDCA production capacity to 100t/year by upgrading technology and optimizing production equipment.

INCREASE THE PER UNIT YIELD THROUGH COOPERATION AND COMMUNICATION

The production of PEF by FDCA polymerization is our main development direction. By working with a number of universities, scientific research institutions and leading enterprises, we will be the first in the world to exceed 100t in PEF production capacity.

INNOVATION IMPROVES PROFITS

We innovatively apply advanced catalytic and molecular design technologies to the development of HMF and its derivatives and end products. At present, there are already end products selling well in the market, contributing to our sales.

CORE TEAM

Zhang Jian

Co-Founder / Chief Scientist

The HMF developed by him is one of the best alternatives to petroleum-based products. Instead of stopping at the existing core technology, he breaks through by continuous innovation from the beginning to end to complete the technological evolution and extension, cross the gap in the process of industrialization, march in the "no man's land", and become the "ice breaker" leading the industry.

Jin Haitao

Founder / Chairman

With a keen business acumen and foresight for sustainable development, he devotes himself to the bio-based economy and leads Sugar Energy's core team to cater to the global demand for clean, efficient and circular energy in the "post-petroleum era" with the wisdom to see potential and the strength to master potential".

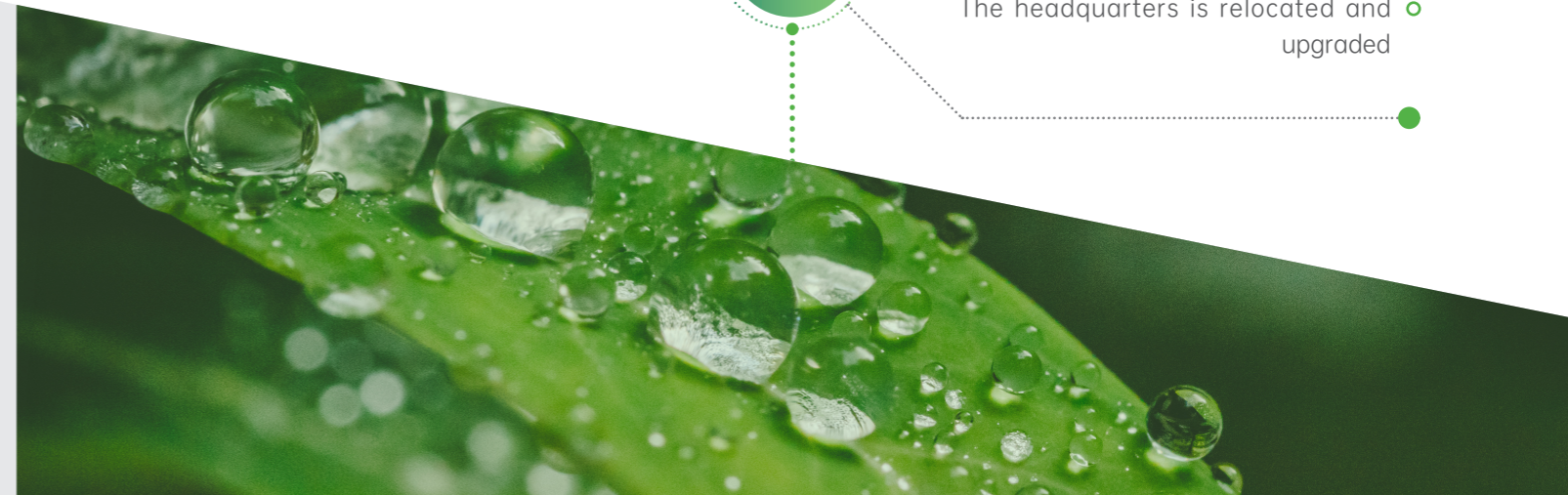
Zhang Wei

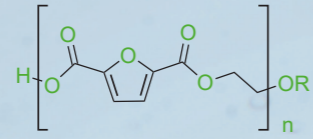
Secretary of the Board of Directors / CEO

With excellent execution skills, he has led Sugar Energy's team to become the first in the world to clear technical hurdles for 1,000t industrial production of HMF from fructose and successfully turn original technology into products. He also has increased research and development efforts for the low-cost production of PEF polyester monomers and their entry into the market, to create a growth engine for the industry and achieve sustainable development.



DEVELOPMENT PLAN





Polyethylene 2,5-furandicarboxylate

PEF



Polyethylene 2,5-furandicarboxylate(PEF) is a 100% recoverable bio-based polymer made from renewable raw materials from plants. PEF, described as the next-generation polyester, has great potential to replace PET, a durable polymer derived from conventional synthetic resources. Compared with PET, PEF has many advantages. Not only does

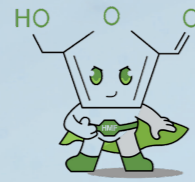
it reduce the overall carbon footprint of various products, but it also improves the sustainability of packaging. PEF has a higher gas barrier to oxygen, carbon dioxide, and water vapor than PET and can therefore be seen as an interesting alternative to existing packaging applications such as bottles, films, and food trays.

APPLICATION FIELDS



PHYSICAL AND CHEMICAL PROPERTIES

Produce Name	Polyethylene 2,5-furandicarboxylate
CAS No.	28728-19-0
Molecular Formula	$(C_8H_6O_5)_n$
Molar Mass	variable
Melting Point	195–265 °C (383–509 °F; 468–538 K)
Density	1.43g/cm ³



5-Hydroxymethylfurfural

HMF



5-Hydroxymethylfurfural is an important chemical raw material. Its molecule contains an aldehyde group and a hydroxymethyl group, which can be used to synthesize many useful compounds and new polymer materials through hydrogenation, oxidative dehydrogenation, esterification, halogenation,

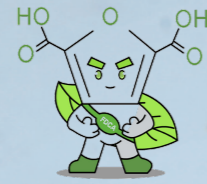
polymerization, hydrolysis and other chemical reactions, Resin plastics, diesel fuel additives, etc. In particular, the bio-based PEF polyester based on furan dicarboxylic acid has demonstrated many characteristics superior to petroleum-based PET (polyethylene terephthalate).

APPLICATION FIELDS



PHYSICAL AND CHEMICAL PROPERTIES

Produce Name	5-Hydroxymethylfurfural
CAS No.	67-47-0
Molecular Formula	C ₆ H ₆ O ₃
Molecular Weight	126.1
Melting Point	28-34°C
Boiling Point	114-116°C at 1mm Hg
Relative Density	1.243g/mL at 25°C
Stability	It is sensitive to air, light and heat, and has strong hygroscopicity. It needs to be sealed and stored at low temperature (< 0 °C)



2,5-Furandicarboxylic acid

FDCA



The key platform compound derived from oxidation of HMF is considered as a renewable green alternative to petroleum-based terephthalic acid. In addition, 2,5-furandicarboxylic acid can be used to

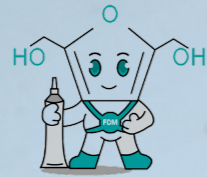
replace m-phthalic acid, succinic acid, bisphenol A, adipic acid and so on in the preparation of bio-based polymers such as polyester, polyamide and epoxy resin.

APPLICATION FIELDS



PHYSICAL AND CHEMICAL PROPERTIES

Produce Name	2,5-Furandicarboxylic acid
CAS No.	3238-40-2
Molecular Formula	C ₆ H ₄ O ₅
Molecular Weight	156.09
Melting Point	> 310°C
Boiling Point	419.2°C at 760 mmHg
Relative Density	1.604g/cm ³ at 25°C
Stability	Stable at room temperature, airtight storage in a cool and dry environment



2,5-Furandimethanol

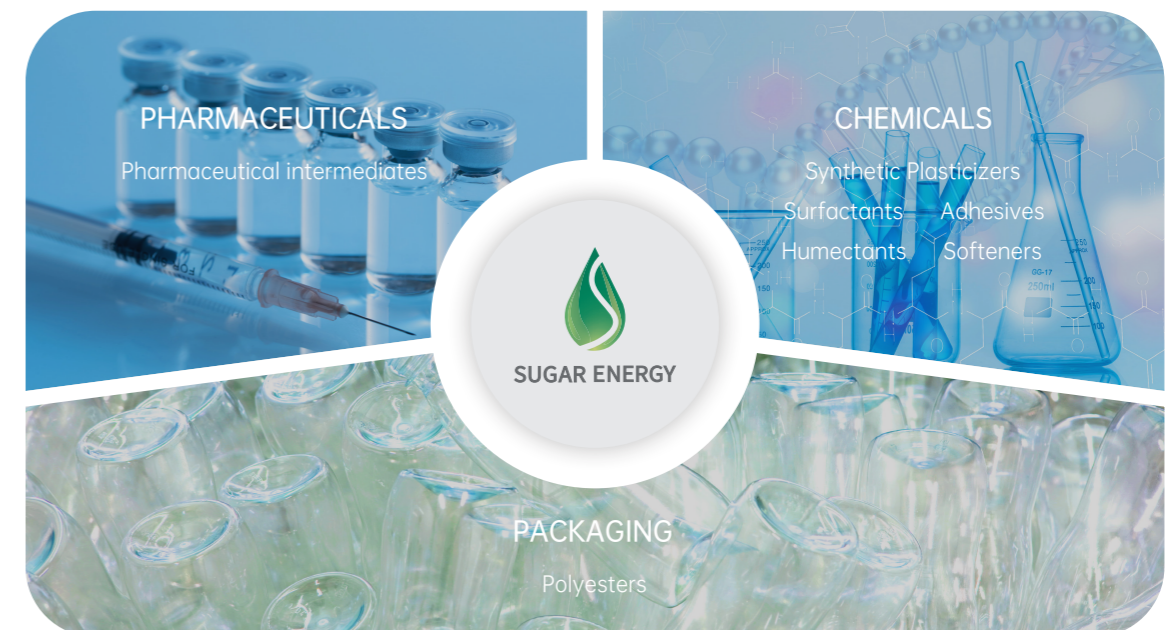
FDM



The chemical intermediates derived from selective hydrogenation of HMF can be used as raw materials to synthesize pharmaceutical intermediates, nucleoside derivatives, crown ethers and other

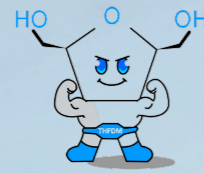
compounds as well as polyester, polyurethane and other polymeric materials. They can also be used as solvents, wetting agents, binders, surfactants, artificial receptors, etc.

APPLICATION FIELDS



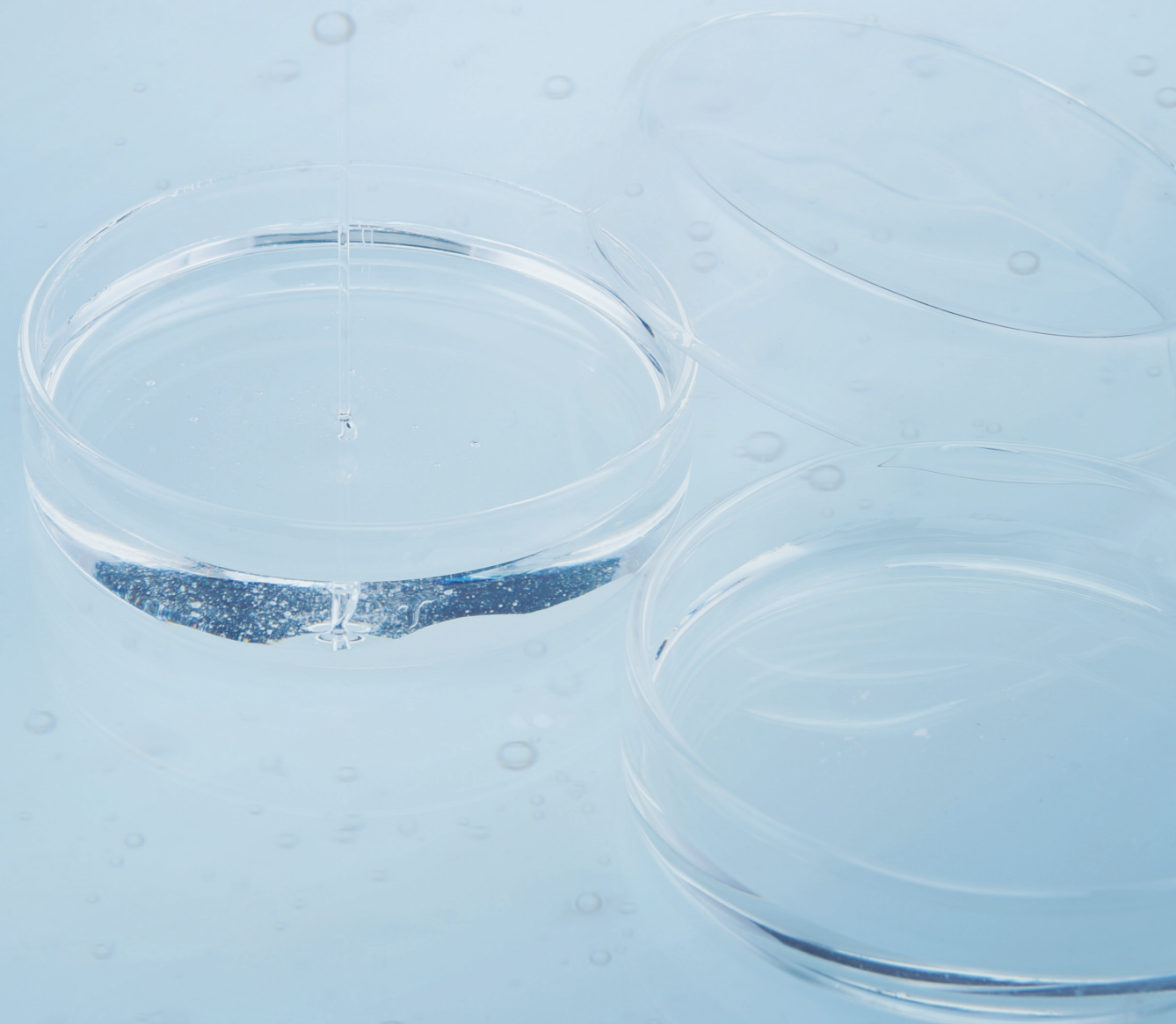
PHYSICAL AND CHEMICAL PROPERTIES

Produce Name	2,5-furandimethanol
CAS No.	1883-75-6
Molecular Formula	C ₆ H ₈ O ₃
Molecular Weight	128.1
Melting Point	74-77°C
Boiling Point	275.4°C
Relative Density	1.283g/cm ³ at 25°C
Stability	Room temperature stable, low temperature storage



2,5-Tetrahydrofurandimethanol

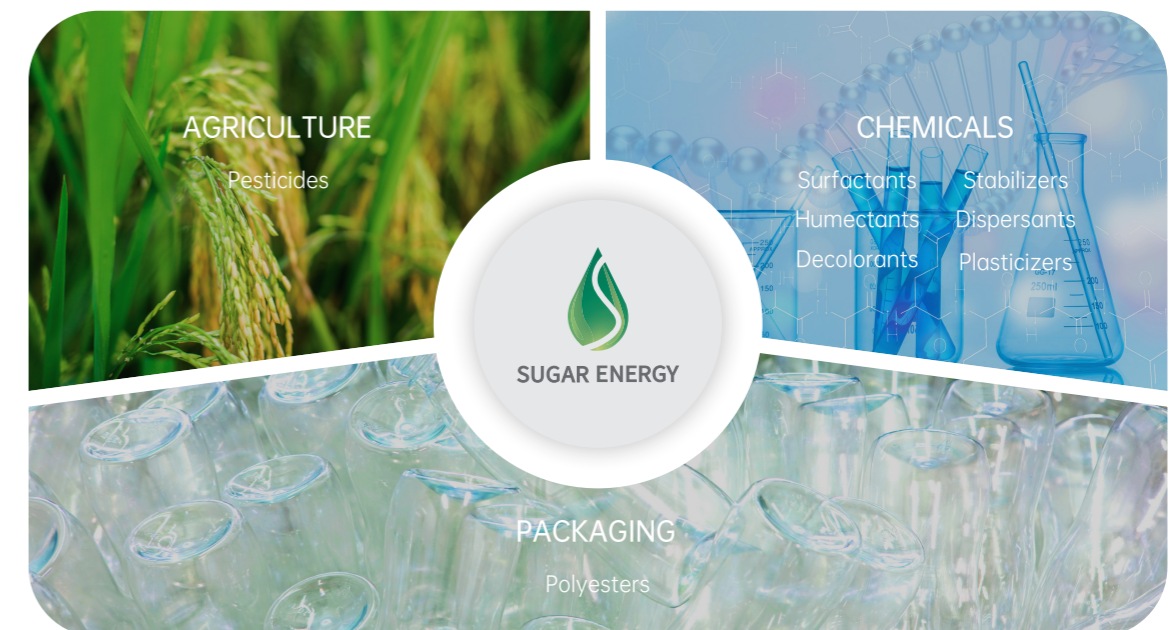
THFDM



The chemical intermediates derived from deep hydrogenation of HMF have higher stability than unsaturated furan compounds and can be used as solvents, stabilizers, wetting agents,

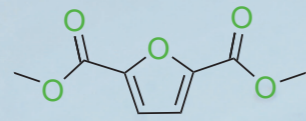
dispersants and decolorizers. In addition, 2,5-tetrahydrofurandimethanol is also used in the preparation of polyamide plastics, plasticizers, insecticides, etc.

APPLICATION FIELDS



PHYSICAL AND CHEMICAL PROPERTIES

Produce Name	2,5-Tetrahydrofurandimethanol
CAS No.	2144-40-3
Molecular Formula	C ₆ H ₁₂ O ₅
Molecular Weight	132.1
Melting Point	< -50°C
Boiling Point	261.6°C
Relative Density	1.130g/cm ³ at 25°C
Stability	Easily hygroscopic, sealed and stored at low temperatures



Dimethyl Furan-2,5-dicarboxylate

FDME



Chemical intermediates derived from the oxidation or esterification of HMF can be used as monomers for polymerization, intermediates for organic

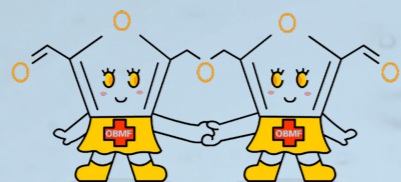
synthesis and pharmaceutical intermediates. They are the raw materials of high-quality PEF through transesterification polymerization.

APPLICATION FIELDS



PHYSICAL AND CHEMICAL PROPERTIES

Produce Name	Dimethyl Furan-2,5-dicarboxylate
CAS No.	4282-32-0
Molecular Formula	C ₈ H ₆ O ₅
Molecular Weight	184.15
Melting Point	117.6°C
Boiling Point	270.9°C at 760mmHg
Relative Density	1.244g/cm ³
Stability	/



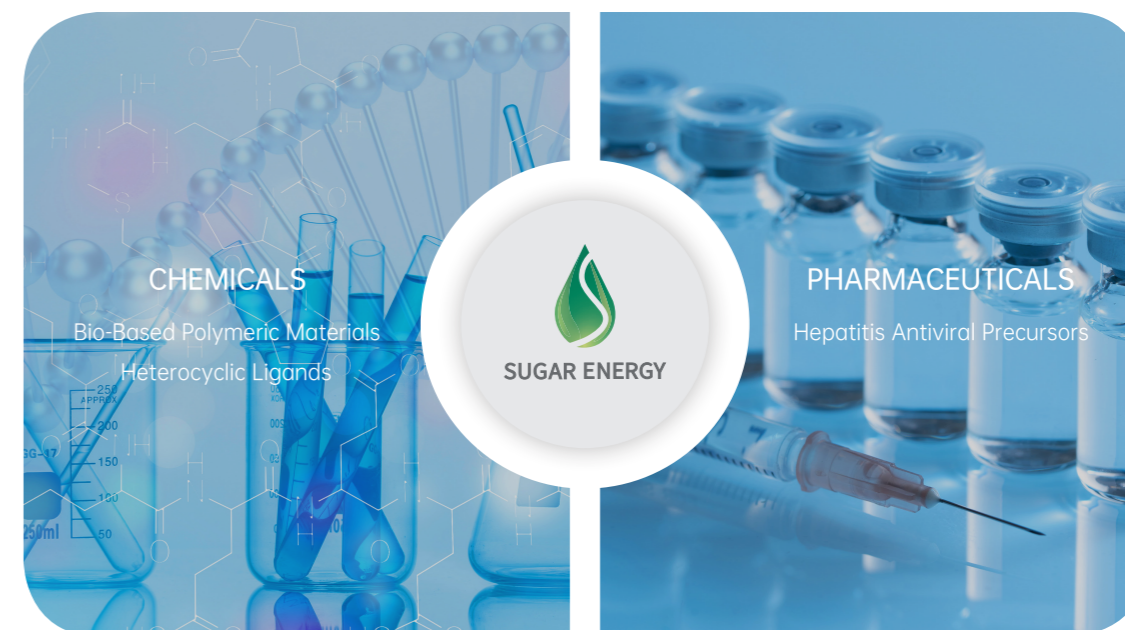
5,5'(oxy-bis(methylene))bis-2-furfural **OBMF**



The products from the etherification of 5-hydroxymethylfurfural can be used as raw materials to prepare polyamide and polyimide bio-

based polymeric materials and can also be used to synthesize heterocyclic ligands and hepatitis antiviral precursors.

APPLICATION FIELDS



PHYSICAL AND CHEMICAL PROPERTIES

Produce Name	5,5'(oxy-bis(methylene))bis-2-furfural
CAS No.	7389-38-0
Molecular Formula	C ₁₂ H ₁₀ O ₅
Molecular Weight	234.20
Melting Point	113.5-115.5°C
Boiling Point	404.8±45.0°C
Relative Density	1.313g/cm ³ at 25°C
Stability	Stable at room temperature, stored at 2-8° C in a dry place, protected from light, and sealed