

# Bio-based Material Quarterly Newsletter

Q1 2022

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# Bio-based Materials Quarterly Newsletter



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## Headline

On 10 Dec., 2021, 18 relevant departments including the Ministry of Ecology and Environment (MEE) and others jointly published the Work Plan for Construction of "Zero-waste Cities" during the "14th Five-year Plan" Period, promoting construction of "Zero-waste Cities" in 100 cities at and above the prefectural level. Provinces/cities like Jiangsu, Shanghai and Shandong delivered their opinions in response.

Recently, Nanle County released the EIA report of overall development plan of biomass industry park, where locales a range of biodegradable material enterprises active in expanding capacity of L-lactic acid, PLA, PLA modified materials and related products.

In Jan., Cathay Biotech proposed to reallocate USD192.02 million (RMB1.21 billion) raised funds originally scheduled for the 40,000 t/a bio-based sebacic acid construction project, to the 500,000 t/a bio-based PDA and 900,000 t/a bio-based PA project.

Regarding to 2021 results, COFCO Biotech estimated net profit surging by over 80% YoY, while by contrast, Kingfa expected a significant drop in its figure. The two companies have been active in the area of biodegradable materials.

In this Q1, BBCA Biochemical has been expanding operation throughout the PLA industrial chain in Weifang City of Shandong Province and Bengbu City of Anhui Province, striving for bigger share in the international bio-based degradable material market with increasing efforts to scale up its LA and PLA capacities.

In Q1 2022, Chinese PLA companies pushed up a number of projects including a signup for new PLA industrial park.

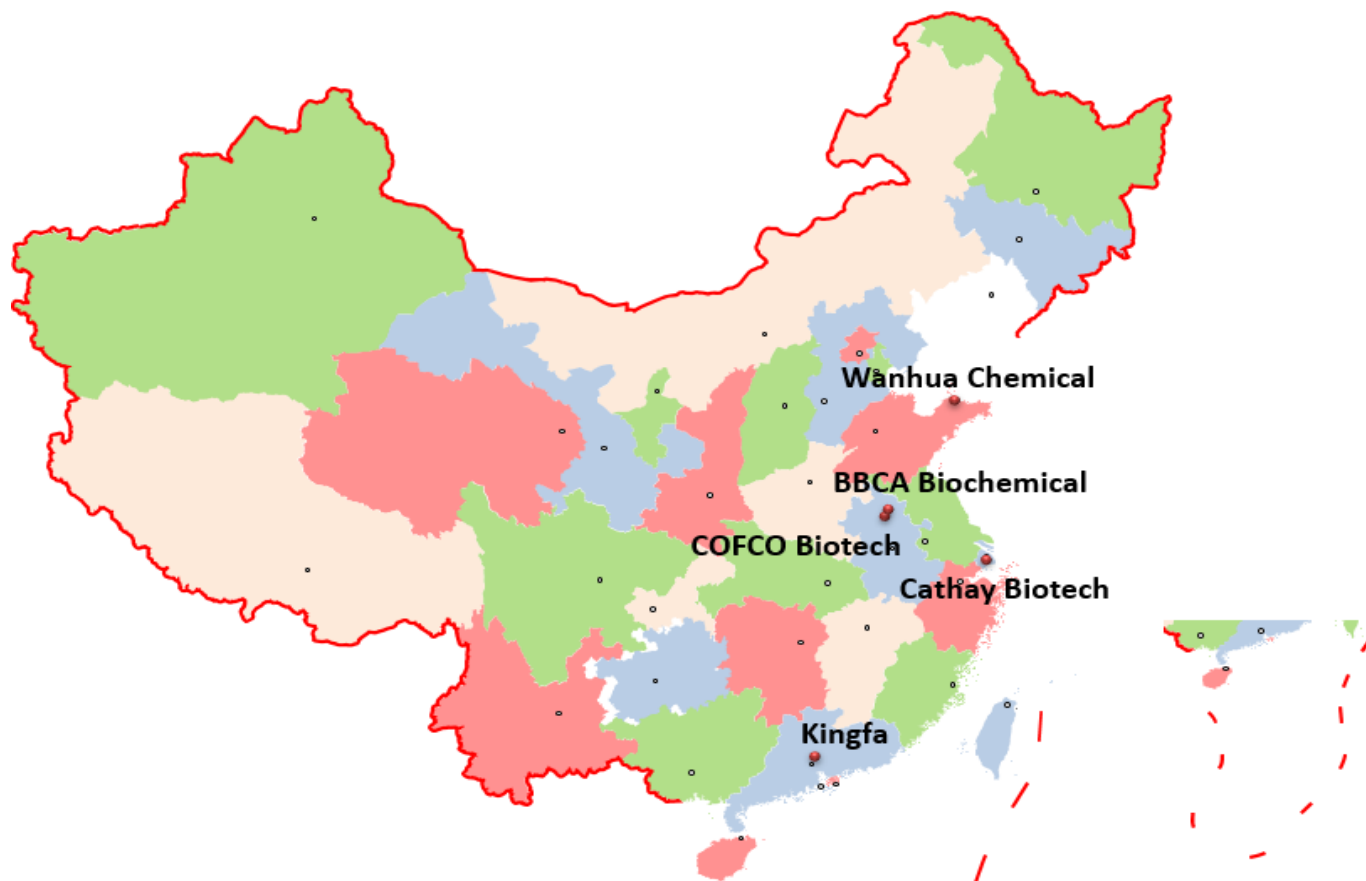
On 19 Feb., Huitong Technology's 105,000 t/a PLA project kicked off construction work.

On 25 Feb., the new energy and biodegradable integrated project of Levima Green broke ground, aiming to build new PPC capacity reaching 50,000 t/a in Tengzhou City, Shandong Province.

In this quarter, Wanhua Chemical has accelerated its planning in the area of bio-based and biodegradable materials; on March 22, the EIA details of the 75,000 t/a PLA integrated project of its subsidiary Wanhua Chemical Sichuan were released.

In mid-Jan., the EIAs of Jinzhu New Material's project of 300,000 t/a bio-based new material and 50,000 t/a fibre moulding, and Panda New Material's project of 600,000 t/a bio-based new material were publicised on local government websites.







## Editor's Note

Welcome to the Bio-based Material Quarterly Newsletter Q1 2022.

### Policy

Provinces accelerate construction of "Zero-waste Cities" in response to the *Work Plan for Construction of "Zero-waste Cities" during the "14th Five-year Plan" Period*; Nanle County released the EIA report of overall development plan of biomass industry park and companies located within are expanding their bio-based material capacities.

### Market dynamics

In Q1, multiple bio-based material projects were carried forward, benefiting development of the bio-based degradable material PLA industry: BBCA Biochemical is pushing layout in PLA industry; Wanhua Chemical has fostered its planning in the area of bio-based and biodegradable materials; A number of PLA projects also are underway, including that of Shandong Tongbang, Jiangxi Keyuan, Pliith Biotechnology, Ningxia Qiyu and Huitong Technology; and there are updates on Jingliang Longjiang's LA project and Langjing New Material's lactide project.

### Company performance

COFCO Biotech marked over 80% of YoY growth in net profit while Kingfa saw notable drops—the two companies are active players in the area of biodegradable materials; Cathay Biotech proposed to reallocate funds to bio-based nylon project; Bluepha and Weigou Workshop closed new rounds of financing for PHA capacity expansion; Levima Green's 50,000 t/a PPC project started construction work as details of the bio-based projects of Jinzhu New Material and Panda New Material were publicised; GS Biotech's cooperative agreement for over one tonnes production of FDCA may be a booster shot for HMF downstream bio-based material market.

### Price

In the first quarter of 2022, PLA underwent a downtrend while PHA was able to stand firm.

The USD/CNY exchange rate in this newsletter is USD1.00=CNY6.3014 on 1 March, 2022, sourced from the People's Bank of China. Unless otherwise specified, all the prices mentioned in this newsletter will include the VAT.





## Governmental Direction

### Construction of "Zero-waste Cities" expedited across provinces

Summary: On 10 Dec., 2021, 18 relevant departments including the Ministry of Ecology and Environment (MEE) and others jointly published the Work Plan for Construction of "Zero-waste Cities" during the "14th Five-year Plan" Period, promoting construction of "Zero-waste Cities" in 100 cities at and above the prefectural level. Provinces/cities like Jiangsu, Shanghai and Shandong delivered their opinions in response.

On 10 Dec., 2021, 18 relevant departments, such as the Ministry of Ecology and Environment (MEE) and the National Development and Reform Commission, jointly published the Work Plan for Construction of "Zero-waste Cities" during the "14th Five-year Plan" Period (hereafter referred to as the Plan), promoting construction of "Zero-waste Cities" in some 100 cities at and above the prefectural level.

The Plan prioritises governance of plastic pollution in each industrial link, which aimed at minimising the use of disposable plastic products, promoting use of degradable plastic substitutes and strengthening the recycling of plastic waste. Other key focuses are on quickening utilisation of green (recyclable) packages in the express delivery industry, and programmes to clean up ocean plastic waste.

Back to 2019, the MEE had listed 11 cities (Shenzhen, Baitou, Xuzhou, Xining, etc.) and 5 special development zones (Xiong'an New Area, etc.) in the "Zero-waste Cities" pilot programme.

On 9 Jan., 2022, the General Office of Jiangsu Government issued the work plan for provincial construction of "Zero-waste Cities". Key takeaways are as follows:

- Promote the R&D of key technologies in the entire industrial chain that integrates straw/corn cobs processing with PLA (polylactic acid) degradable materials manufacturing, and high quality development of industrial clusters associated with bio-based degradable materials, via for example, formulating and improving the (new/existing) technical standards for end-products including bio-based degradable plastic bags and agricultural films.
- Firmly govern the full life cycle of the plastic industry, and discourage the use of plastics based on source reduction, specially through scientific promotion of plastic substitutes.
- Set up relative demonstration (meaning up to national standards) policies and regulations based on its experiences in reforming and piloting the green development of industrial concentration, the low-carbon and circular economy, rural vitalization, resource utilisation, etc.
- In particular, multiple uses of agricultural film, inter-row film covering and other agricultural techniques will be brought forward, in addition to the introduction of fully biodegradable agricultural film.

On 15 Feb., 2022, the Shanghai Market Regulation Department also made public its opinions on the promotional work for "Zero-waste City" construction. Key takeaways are as follows:

- Plastic products such as plastic bags and PE (polyethylene) agricultural film will be included in the local list for product quality monitoring and spot checking. Administrative punishments will be filed on non-biodegradable plastic products.
- Step up monitoring on the reduction of commodity packaging: approximately 1200 batches of packages of locally-made or -marketing commodities such as cakes and pastries, tea leaves, beverages and alcohols, health foods, and cosmetics, will be monitored and checked.







- Strengthen the enforcement of laws and regulations and urge providers of food catering services to voluntarily not offer disposable tableware.

Furthermore, on 25 Feb., 2022, the Ecology and Environment Bureau of Shandong Province conveyed its interpretation on the "Zero-waste City"-related policies in a video meeting, Short-term key tasks should focus on the areas of development of green industry, green agricultural production, green living style, reform and innovation of green technologies, and related monitoring and disposal mechanisms, to advance the provincial-level construction based on the success made in Weihai City, the pilot city.

### **Nanle County: EIA report of overall development plan of biomass industry park unveiled**

Summary: Recently, Nanle County released the EIA report of overall development plan of biomass industry park, where locales a range of biodegradable material enterprises active in expanding capacity of L-lactic acid, PLA, PLA modified materials and related products.

Since Henan Provincial Government's issue of *Administrative Measures for Classification of Domestic Waste in Cities of Henan Province* in 5 Jan., which bans manufacturing, selling and application of non-degradable disposable plastic products as stipulated in Article 16 and effective as of 1 March, Nanle County has seen local bio-based industry growing in the face of new policy-driven development opportunities. To date, there are 16 biodegradable material enterprises settled in the county. The system of production of bio-fermented L-lactic acid, synthetic polylactic acid (PLA), modified PLA materials, has attracted cumulated investment up to USD250.74 million (RMB1.58 billion) and achieved 500,000 t/a of production capacity as a whole.

In mid-Feb., the the environmental impact assessment (EIA) report of the county's overall development plan of biomass industry park (2021-2030) was disclosed.

#### **Development plan at a glance:**

- Name of planning area: Nanle County Biomass Industry Park
- Development focus: PLA-oriented core and basic industries, premium bio-based new materials, premium bio-based chemicals
- Development goal:
  - 2021-2025: The park attains preliminary results in PLA supply localisation with collective capacity up to 200,000 t/a, and other capacities of customised PLA downstream products via blow moulding, film blowing, vacuum forming, etc.; the PLA-centred area presents gradual demonstration effect.
  - 2026-2030: Overall capacity of PLA reaches 500,000 t/a; major technical progress is made in PLA mixing and poly (D-lactide) (PDLA) production; grade and application of PLA downstream products are lifted and broadened aligned with China's plastic restrictions and national demand for substitutes.

Capacity expansion projects of some biodegradable material enterprises in the park are summarised as follows:

#### **Henan Xinghan Biological Technology Co., Ltd.**

- The 30,000 t/a straw-based lactic acid (LA) project, with total investment of USD69.83 million (RMB440 million) and occupying an area of 120 mu, has been operational since Oct. 2019.
- The 50,000 t/a polymer-grade L-lactic acid project, is set for trail run in April 2022.
- The 200,000 t/a polymer-grade L-lactic acid project, with total investment of USD396.74 million (RMB2.5 billion) and occupying an area of 350 mu (including 200 mu of new lands), will bring in 200,000 t/a of LA as well as 30,000 t/a lactate esters once running at full load.





- Its phase I construction accounts for 100,000 t/a of L-lactic acid and is scheduled to complete in Oct. 2022.
- The whole construction work of this project will close and all production lines will start up by the end of 2024.

#### **Henan Longdu Torise Biomaterials Co., Ltd.**

- The project of 50,000 t/a PLA modified resin material and 50,000 t/a related products, is invested with USD40.15 million (RMB253 million) and occupying 60 mu, It's operational production range (since May 2021) comprises of the following items: PLA (8,000 t/a), modified resin (10,000 t/a in phase I and 22,000 t/a in phase II), degradable plastic film bags (8,000 t/a in phase I and 24,000 t/a in phase II).
- Its constructing project refers to 10,000 t/a biodegradable material and related products.

#### **Henan Yongle Bioengineering Co., Ltd.**

The proposing 100,000 t/a L-lactic acid project and the 60,000 t/a PLA project are designed to be constructed over two phases, each aiming to build up 50,000 t/a of LA and 30,000 t/a of PLA. The project investment is projected to sum up to USD238.04 million (RMB1.5 billion).

#### **Hongye Biological Technology Co., Ltd.**

- The constructing 60,000 t/a cellulose project, invested with USD14.28million (RMB90 million), upgrades and transfers the existing capacity (20,000 t/a of furfural) to 60,000 t/a of cellulose and 40,000 t/a of furfural.
- The proposing 600,000 t/a bio-degradable polybutylene succinate (PBS) project with investment of USD476 million (RMB3 billion), adopts polymerisation process in producing PBS, polybutylene adipate-co-terephthalate (PBAT), polybutylene succinate-co-terephthalate (PBST), polybutylene succinate adipate (PBSA), polyethylene terephthalate glycol (PETG), and by-product tetrahydrofuran (THF).
- Other projects associated with bio-based monomer materials, bio-based materials and pharmaceutical intermediates, are underway.

#### **Henan Xijiang Biotechnology Co., Ltd.**

- A project of 10,000 t/a degradable particles and 30,000 t/a degradable plastic products was proposed with investment of USD31.74 million (RMB200 million) and occupying an area of 100 mu.
- The project of 50,000 t/a modified PLA compound and 50,000 t/a degradable plastic bags is to be built over two phases: the first (30,000 t/a of degradable plastic bags) entered operation in 2019 and the second is under construction.







## Market Dynamics

**Cathay Biotech to reallocate RMB1.21 billion funds to 500,000 t/a bio-based nylon project**

Summary: In Jan., Cathay Biotech proposed to reallocate USD192.02 million (RMB1.21 billion) raised funds originally scheduled for the 40,000 t/a bio-based sebacic acid construction project, to the 500,000 t/a bio-based PDA and 900,000 t/a bio-based PA project.

On 11 Jan., Cathay Biotech Inc. (Cathay Biotech) released proposal to adjust the raised funds originally scheduled for the 40,000 t/a bio-based sebacic acid construction project at USD271.53 million (RMB1.71 billion) down to USD79.55 million (RMB0.5 billion), and reallocate the rest totalling USD192.02 million (RMB1.21 billion) to the 500,000 t/a bio-based pentamethylene diamine (PDA) and 900,000 t/a bio-based polyamide (PA) project.

**TABLE 1:** Details of investment projects after change, million USD

Project	Total investment	Amount of raised funds to be invested	Invested amount of own funds
40,000 t/a bio-based sebacic acid construction project	271.53	79.55 (65.07 has been inputted)	/
500,000 t/a bio-based PDA and 900,000 t/a bio-based PA project	219.64	192.02	73.27
<b>Total</b>	<b>246.77</b>	<b>271.53</b>	<b>-</b>

Source: Cathay Biotech

**Overview of 40,000 t/a bio-based sebacic acid construction project**

- Total investment: USD271.53 million
- Major construction content: raw material distillation equipment, fermentation workshop, extraction workshop, refinement workshop
- Commencement of operation (estimated): the year of 2022
- Executive entity: Cathay (Taiyuan) Biotechnology Co., Ltd., established in Nov. 2020 with a registered capital of USD158.69 million (RMB1.0 billion), and owned by Cathay (Jinxiang) Biomaterial Co., Ltd. (50.125% of holding shares) and Shanxi Transformation Industrial Park Group Co., Ltd. (49.875% of holding shares).

**Overview of 500,000 t/a bio-based PDA and 900,000 t/a bio-based PA project**

- Total investment: USD219.64 million
- Major construction content: composed of four parts—constructions of main body, auxiliary works, public utility and storage and transportation engineering. Main body includes raw material area, extraction processes; auxiliary works includes pure water preparation system, circulating water cooling system, refrigerating system, etc.
- Commencement of operation (estimated): the year of 2023
- Executive entity: Cathay (Taiyuan) Biomaterial Co., Ltd., established in Nov. 2020 with a registered capital of USD0.73 billion (RMB4.6 billion), and owned by Cathay Biotech (50.125% of holding shares) and Shanxi Transformation Industrial Park Group Co., Ltd. (49.875% of holding shares).

**Sebacic acid production expansion and long-chain dibasic acids (LCDAs) business strength**

On 25 Feb., Cathay Biotech announced the 2021 Preliminary Earnings Estimate, which disclosed that the company's operating revenue





hit USD348.74 million(RMB2.20 billion), up by 46.78% YoY, and total profit reached USD116.18 million (RMB0.73 billion), up by 40.57% YoY. These growths were mostly contributed by the increased sales in main products such as LCDAs and PAs, which were the results of Cathay Biotech's expansion in the LCDAs market and operation launch of the bio-based PA production line, plus the abating negative effects of COVID-19 pandemic.

Regarding product quality, the company's bio-based sebacic acid outperforms the chemical LCDAs. That means the new launch of 40,000 t/a sebacic acid production will bring edges to Cathay Biotech's business.

### **Bio-based nylon PA56 production gaining speed**

At this stage, Cathay Biotech has three key production based standing in Jinan City of Shandong Province, Taiyuan City of Shanxi Province and Wusu City of Xinjiang Uygur Autonomous Region.

- The operational capacity of 75,000 t/a of bio-based LCDAs (DC11-DC18) is distributed in bases in Jinan and Wusu cities.
- The production lines of 50,000 t/a bio-based PDA and 100,000 t/a PA are located in Jinan City; production lines of bio-based PA56 series (Tyron, E-2260, E3300, E6300, etc.) has entered operation since H1 2021.
- The production project of 40,000 t/a bio-based sebacic acid and 900,000 t/a bio-based PA are set at base in Taiyuan City.

Leaving aside the bio-based nylon products, China's nylon market has seem production techniques of adiponitrile, upstream material of nylon PA6 series, growing matured. Specifically, such big names as Invista Nylon Chemical (China) Co., Ltd., China National Chemical Corporation Ltd., and Huafon Group Co., Ltd. have been an adiponitrile production force at home.

In the face of its product's competitor nylon PA6 series, Cathay Biotech responded that, on one side, domestic production techniques of adiponitrile still takes time to reach maturation stage and optimum cost structure; on the other hand, its bio-based production processes have been adopted in large-scale production, and notably, PDA embodies a greater potential in the cost competition on the grounds of PDA's function as a crucial monomer of bio-based nylon PA56.

By all odds Cathay Biotech's act of reallocating over a billion of RMB to PDA and PA production project, will expedite the market entry of bio-based nylon PA56.

### **Kingfa and COFCO Biotech release performance forecasts for 2021**

Summary: Regarding to 2021 results, COFCO Biotech estimated net profit surging by over 80% YoY, while by contrast, Kingfa expected a significant drop in its figure. The two companies have been active in the area of biodegradable materials.

#### **COFCO Biotechnology Co., Ltd. (COFCO Biotech)**

On 24 Jan., COFCO Biotech unveiled its performance forecasts for 2021. Key data is as follows:

- Net profit attributable to equity shareholders of the listed company (estimated): USD171.39 million (RMB1.08 billion)-USD187.26 million (RMB1.18 billion), up by 82%-99% YoY
- Net profit attributable to equity shareholders of the listed company excl. extraordinary gains/losses (estimated): USD155.52 million (RMB0.98 billion)-USD179.33million(RMB1.13 billion), up by 88%-117% YoY





This notable growths were results from the company's development of purchasing mode for wide varieties of raw materials, which help reduce costs. Meanwhile, product prices were raised compared with that for 2020, bringing in more gross profit on sales.

COFCO Biotech now holds a series of product production technologies in hand, namely of starch, starch sugar, lactic acid (LA), lactide and polylactic acid (PLA).

In recent years, it has been developing a bio-based degradable materials whole industrial chain demonstration base in Jilin Province. Since 2005, the company's PLA project team, starting in the PLA product application market of the lower reaches, has been reaching up to upper end.

- In 2020, Jilin COFCO Biomaterial Co., Ltd., subsidiary of COFCO Biotech, marked quantity production in its 30,000 t/a PLA raw materials and products project which was designated in Changchun City, Jilin Province.
- In Aug. 2021, COFCO Bio-chemical Energy (Yushu) Co., Ltd., subsidiary of COFCO Biotech, announced commencement of construction of its 1,000 t/a PHA project in Changchun City, Jilin Province. This project is set to put into production in 2022.
- In Dec. 2021, COFCO Biotech incorporated wholly-owned subsidiary COFCO Biomaterial (Yushu) Co., Ltd. with investment totalling USD23.80 million (RMB150 million). This subsidiary mainly engages in the R&D and production of lactide, lactic acid (LA), PLA and PLA-based products, etc. Its 30,000 t/a lactide project is scheduled to undergo the 24-month construction in this spring and start production by the end of 2023.

#### **Kingfa Sci. & Tech. Co., Ltd. (Kingfa)**

On 29 Jan., Kingfa published its performance forecasts for 2021. Key data is as follows:

- Net profit attributable to equity shareholders of the listed company (estimated): USD218.52 million(RMB1.38 billion)–USD306.60 million (RMB1.93 billion), down by 57.89%–69.99% YoY
- Net profit attributable to equity shareholders of the listed company excl. extraordinary gains/losses (estimated): USD198.05 million (RMB1.25 billion)–USD286.13 million (RMB1.80 billion), down by 59.36%–71.87% YoY

Factors accounting for the estimated declines:

- Green petrochemical sector: due to rising prices of raw materials, cost increased and product gross profit went down compared with the result from a year earlier.
- Medical & health sector: China's stringent control of the pandemic allowed recovery in prices of protective equipment. Therefore, the company saw main product sales and selling prices on the slide.

Kingfa businesses in modified plastics, new materials (fully biodegradable plastics, high-performance engineering plastics, high-performance carbon fibre and composite materials), green petrochemical products, environmentally friendly and high-performance recycled plastics, medical & healthcare products, etc. Despite that the company's forecasts did not mention other sectors, Q1–Q3 data showed that sectors of modified plastics and new materials, have performed well with new material sales in particular seeing relatively rapid growth.

Reportedly, it has participated in the R&D and industrialisation of biodegradable plastics since 2004 and made its way to one of the biggest PBAT producers in China with PBAT capacity up to 120,000 t/a at present. An additional 30,000 PLA project is now under





construction and designated to launch for production in H1 2022—it is projected that project construction would complete in Q4 2021, whereas there are no updates on project coming into service so far.

### BBCA Biochemical pushing layout in PLA industry

Summary: In this Q1, BBCA Biochemical has been expanding operation throughout the PLA industrial chain in Weifang City of Shandong Province and Bengbu City of Anhui Province, striving for bigger share in the international bio-based degradable material market with increasing efforts to scale up its LA and PLA capacities.

As a leader in Chinese agricultural product deep processing, Anhui BBCA Biochemical Co., Ltd. (BBCA Biochemical) focuses on three areas of biochemical, biomaterial and bioenergy. It has independent intellectual property rights (IIPR) pertaining to production technologies applicable throughout the polylactic acid (PLA) industrial chain, including for straw-based sugar manufacturing, lactic bacterial culture, lactic acid (LA) fermentation, lactide synthesis and polymerisation. Also it owns the relevant product application techniques for downstream industries and multiple concerning patents.

Responding to the national plastic ban, BBCA Biochemical is speeding up its layout in PLA industry. Since 2016, the company kicked off construction of a bio-industry production base in Guzhen County, Bengbu City, Anhui Province, which centres around five product series of organic acids, amino acids, vitamins, active pharmaceutical ingredients (API) and biomaterials.

- The construction of this production base is underway as scheduled, setting to establish 6 modular projects, each with 500,000 t/a of LA and 300,000 t/a of PLA or totalling 3 million t/a of LA and 2 million t/a of PLA
- The construction commencement of the first modular buildings was in Sept. 2020, and looks set to conclude and get production on stream in H1 2022. They will span 200 ha (3,000 mu) of area and be erected over four phases ending by 2025, with estimated investment in fixed assets arriving at around USD11.90 billion (RMB75.0 billion).
- On 8 Nov., 2019, the company started up the China's first whole industrial chain demonstration production line with LA & PLA capacity up to 5,000 t/a and 3,000 t/a respectively.
- In Dec. 2021, it's 150,000 t/a LA and 100,000 t/a PLA capacities were built up and has become operational since then.

On 18 Feb., 2022, the environmental impact assessment (EIA) report (consultation paper) of the 100,000 t/a bio-based polyol project of Anhui Huaihai Biotechnology Co., Ltd. (Huaihai Biotech), a subsidiary of BBCA Biochemical incorporated in Sept 2021 and situated at the abovementioned production base, was posted on the local government's website.

#### Overview of 100,000 t/a bio-based polyol project

- Construction type: New construction
- Construction unit: Huaihai Biotech
- Location: Economic and Technological Development Zone of Guzhen County, Bengbu City, Anhui Province
- Area: total 8,793 m<sup>2</sup>, composed of 2,457 m<sup>2</sup> of production workshop, 2,304 m<sup>2</sup> of each of the two finished product warehouses, and 1,728 m<sup>2</sup> of raw and auxiliary materials storeroom
- Total construction investment: USD59.99 million (RMB378 million), 3.17% (=USD1.90 million (RMB12 million) of which is for environmental protection
- Constructing capacity: 100,000 t/a of PLA polyol, and 10,000 t/a by-product 5% LA for downstream production of LA products
- Technology roadmap: Polymerisation of lactide and polyol—linear and star-shaped PLA polyol





- Working system: 69 employees working in 3 three shifts for 300 days per year
- Construction period: Two years (project enters operation in 2024)

In May 2021, BBCA Biochemical's subsidiary Beijing Fengyuan Taifu Biotechnology Co., Ltd., posted investment plan with a total of USD2.38 billion (RMB15.0 billion) in a PLA new material whole industrial chain project designated in Binhai Area in Weifang City, Shandong Province. In Dec. 2021, Shandong BBCA Biotechnology Co., Ltd. (BBCA Biotechnology) and Shandong BBCA Biomaterial Co., Ltd. (BBCA Biomaterial) were founded. Sequentially on 4 March this year, the first EIAs of the 180,000 t/a LA project and the 100,000 t/a PLA project under respective responsibility of the two companies, were revealed.

### Overview of the 180,000 t/a LA project

- Construction type: New construction
- Construction unit: BBCA Biotechnology
- Location: Binhai Economic and Technological Development Zone, Shandong Province
- Total investment: USD152.35 million (RMB960 million)
- Construction content:
  - new purchasing equipment: fermentation tank, separation and purification system, circulating water cooling system, etc.
  - new construction: fermentation workshop, extraction workshop, refinement workshop, and public and auxiliary utilities
- Scheduled capacity: 180,000 t/a of LA
- Production process: bio-fermented method using glucose as main raw material
- Construction period: 2022–2024

### Overview of the 100,000 t/a PLA project

- Construction type: New construction
- Construction unit: BBCA Biomaterial
- Location: Binhai Economic and Technological Development Zone, Shandong Province
- Site area & floor area: 5 ha (50,000 m<sup>2</sup>) & 8 ha (120 mu)
- Total investment: USD122.20 million (RMB770 million)
- Construction content:
  - New purchasing equipment: rectification tower, polymerisation tower, etc.
  - New construction: lactide preparation workshop, polymerisation workshop, and supporting public and auxiliary utilities
- Scheduled capacity: 100,000 t/a of PLA
- Production process: "Two Steps" (microwave heating and conventional heating in the ring-opening polymerisation (ROP) of lactide) polymerisation, using LA with high optical purity as main raw material
- Construction period: 2022–2024

## Multiple PLA projects in progress

Summary: In Q1 2022, Chinese PLA companies pushed up a number of projects including a signup for new PLA industrial park.

### Shandong Tongbang New Materials Technology Co., Ltd. (Shandong Tongbang)

On 15 March, the environmental impact assessment (EIA) report of the 300,000 t/a lactic acid (LA), 200,000 t/a polylactic acid (PLA) and 100,000 t/a PLA fibre production line project of Shandong Tongbang, was publicised for the first time. Details are as follows:

- Construction type: New construction





- Location: Haiyang City (county level), Yantai City (prefecture level), Shandong Province
- Investment: USD603.04 million (RMB3.8 billion)
- Site & floor area: 39.44 ha (394,350 m<sup>2</sup>) & 40.03 ha (400,338 m<sup>2</sup>)
- Production capacity: 300,000 t/a of LA, 200,000 t/a PLA and 100,000 t/a PLA fibre
- Number of employees: 541

### **Jiangxi Keyuan Bio-Material Co., Ltd. (Jiangxi Keyuan)**

On 9 Feb., the EIA of the 200,000 LA and 130,000 t/a PLA project of Jiangxi Keyuan, was made public for the second time. Details are as follows:

- Construction nature: New construction
- Location: Lianxi District, Jiujiang City, Jiangxi Province
- Investment: USD396.74 (RMB2.50 billion)
- Area: 26.7 ha (267,000 m<sup>2</sup>)
- Commencement of operations: Phase I starts in 2023 and phase II in 2025
- Production capacity:
  - Phase I: 100,000 t/a of LA, and 40,000 t/a of PLA relying on one 30,000 t/a high-gloss pure PLA production line and one 10,000 t/a low-gloss pure PLA line
  - Phase II: adding 100,000 t/a of LA, and 100,000 t/a of PLA relying on two 50,000 t/a high-gloss pure PLA production line and transforming the 30,000 t/a high-gloss pure PLA line constructed in the first phase to a 20,000 t/a low-gloss pure PLA line

### **Pliith Biotechnology Co., Ltd. (Pliith Biotechnology)**

On 15 Jan., Pliith Biotechnology celebrated the topping out of main structures in its 75,000 t/a L-lactic acid and 50,000 PLA smart plant construction project—phase I of the company's 350,000 t/a PLA project. This stage marked the completion of setup of R&D building and other main bodies, and has laid a solid foundation for the following construction and installation of key production equipment. These first phase capacities are parts of the overall target (350,000 t/a of PLA), accounting for USD317.39 million (RMB2.0 billion) of the total USD1.36 billion (RMB8.6 billion) project investment.

### **Ningxia Qiyu Biological New Material Co., Ltd. (Ningxia Qiyu)**

In the second half of Feb., Ningxia Qiyu's 50,000 t/a high purity L-lactic acid and 25,000 t/a PLA project (phase I) started to run at pilot scale.

The company activated the idle plant and production lines of Ningxia Hypow Bio-technology Co., Ltd., with USD82.2 million (RMB518 million) of input for launching of this 50,000 t/a high purity L-lactic acid and 25,000 t/a PLA technical transformation and upgrading project. A comprehensive evaluation will be performed following a full-load and stable production in phase I and before starting up the 25,000 t/a PLA production line construction according to the project (phase II).

Ningxia Qiyu was established in Nov. 2020 with a registered capital of USD47.61 million (RMB300 million).

### **Tongjieliang PLA Industrial Park**

In Feb., a deal on constructing Tongjieliang PLA Industrial Park was reached on the Enterprise Development Conference of Shishi City,





Quanzhou City, Fujian Province. An aggregate of USD1.90 billion (RMB12 billion) will be injected in the three-phased construction project which includes new introduction of production equipment and buildup of a LA–PLA integrated plant.

Shanghai Tongjieliang Biological Materials Co., Ltd. was founded in 2005 with a registered capital of USD20.85 million (RMB131.4 million) and has a production base located in Ma'anshan City, Anhui Province. It mainly engages in the R&D, production and sale of PLA products, and is capable of producing 10,000 t/a of PLA.







## Company Development

### Huitong Technology's 105,000 t/a PLA project enters construction stage

Summary: On 19 Feb., Huitong Technology's 105,000 t/a PLA project kicked off construction work.

On 19 Feb., Yangzhou Huitong Biological New Material Co., Ltd., subsidiary of Yangzhou Huitong Technology Co., Ltd. (Huitong Technology) announced the start of construction work of the 105,000 t/a polylactic acid (PLA) project during the groundbreaking ceremony held in the Economic Development Zone of Yangzhou City, Jiangsu Province. This project plans to adopt the company's self-developed lactide production equipment and technology and introduce foreign advanced patented technologies and sets of core equipment. Additionally, it aims to industrialise the whole production processes of "LA (lactic acid)-PLA" and PLA series with supports of the owned PLA series products modification and processing technologies.

#### Project overview

- Executive body: Yangzhou Huitong Biological New Material Co., Ltd.
- Total investment: USD317.39 million (RMB2.0 billion)
- Area: 200 mu
- Scheduled capacity: 105,000 t/a of PLA
- Project review:
  - April 2021, Huitong Technology cooperated with Zhejiang Sci-tech University in establishing R&D centre which focus on new materials, particularly, on PLA materials. Zhejiang Sci-tech University input talents and was responsible for administration.
  - June 2021, the company brought forward investment plan with USD2.38 million(RMB15.0 million) for constructions of 5 production lines representing 10,000 t/a of new modified materials such as bio-based and biodegradable plastics. This construction plan was conducted by its subsidiary Yangzhou Huitong New Material Co., Ltd.
  - Sept. 2021, Huitong Technology proposed to build a 105,000 t/a PLA and bio-based degradable material series project whose construction work will be taken charge by Yangzhou Huitong Biological New Material Co., Ltd.

Huitong Technology was founded in 1998 with a registered capital of USD13.84 million (RMB87.2 million). Its main operation includes the R&D and manufacturing of polymer chemical products like polyester (PET) and nylon, and product innovation. To date, the company has developed production equipment available for a wide range of degradable plastics (PBAT, PBS, PBT, PBSA, PBST). Capacity of each production line could hit 100,000 t/a.

On 4 March, Sulzer posted on its website that a technology and key equipment contract was sealed with Yangzhou Huitong Biological New Material Co., Ltd. for its PLA project which accounts for 30,000 t/a of PLA capacity. Huitong Technology said Sulzer produces PLA products in all forms and provides integrated technique service and cutting-edge production techniques, which help move its production of sustainable materials to an effective one and enable it to meet market demand.

### Levima Green's 50,000 t/a degradable PPC integrated project breaks ground

Summary: On 25 Feb., the new energy and biodegradable integrated project of Levima Green broke ground, aiming to build new PPC capacity reaching 50,000 t/a in Tengzhou City, Shandong Province.





On 25 Feb., Levima Green (Shandong) New Materials Co., Ltd. (Levima Green) marked the inception of construction process of its new energy and biodegradable integrated project. Levima Green was established in Sept. 2021, 75% owned by Levima Advanced Materials Co., Ltd. (Levima).

#### Overview of the new energy material and biodegradable material integrated project

- Construction type: New construction
- Construction unit: Levima Green
- Location: Lunan High-tech Chemical Park of Tengzhou City, Shandong Province
- Area: 110 ha of new acquisition lands
- Investment: USD1.79 billion (RMB11.3 billion)
- Construction content: equipment compatible to produce 1.3 million t/a of methanol-based olefins, 200,000 t/a of ethylene-vinyl acetate copolymer (EVA), 200,000 t/a propylene oxide (PO), 50,000 t/a of poly propylene carbonate (PPC); supporting public and auxiliary facilities
- Working system: 553 employees working in four shifts and two 12-hour running systems (8,000 hour each year)

On 24 Dec., 2021, a Cooperative Agreement on Joint Development of 4th Generation Catalysts-based Industrial Technology of Supercritical Polymerisation of Biodegradable Material PPC Synthesised from Carbon Dioxide and Propylene Oxide was signed between Levima and Changchun Institute of Applied Chemistry (CIAC) of Chinese Academy of Sciences.

- Levima Green is thereafter in charge for building up a 50,000 t/a PPC production line using self-produced carbon dioxide and PO as main raw materials.
- Levima said, the technology of supercritical polymerisation of PPC featuring high single-pass conversion, short reaction time, low production consumption and by-product yield, and producing products with high molecular weight and high carbon dioxide level. The result will be capable of meeting the application standards for films (agricultural film, etc.). Adopting this technology to industrialisation has great significance for carbon fixation and cost reduction, given that over 38% of PPC weight stem from carbon dioxide.

Levima's recent development in biodegradable material and new energy material fields (constructing capacity of biodegradable materials) are presented as followed:

- 200,000 t/a Lactic acid (LA) and 130,000 t/a PLA (construction unit: subsidiary Jiangxi Keyuan Bio-Material Co., Ltd.)
- 150,000 t/a PLA biodegradable material project (construction unit: Levima Green)

#### Wanhua Chemical accelerates planning in bio-based and biodegradable material area

Summary: In this quarter, Wanhua Chemical has accelerated its planning in the area of bio-based and biodegradable materials; on March 22, the EIA details of the 75,000 t/a PLA integrated project of its subsidiary Wanhua Chemical Sichuan were released.

Wanhua Chemical Group Co., Ltd. (Wanhua Chemical) operates in four industrial areas of polyurethane (PU), petrochemicals, fine chemicals and emerging materials. In recent years, it has made frequent moves in the area of bio-based and biodegradable materials with businesses covering the mainstream products—polylactic acid (PLA), poly butylene adipate-co-terephthalate (PBAT) and polybutylene succinate (PBS).

- In Nov. 2021, the 60,000 t/a PBAT project of wholly owned subsidiary Wanhua Chemical (Sichuan) Co., Ltd. (Wanhua Chemical





Sichuan) was completed with the construction project handover procedure, and was scheduled to start operation in 2022.

- In Nov. 2021, the environmental impact assessment (EIA) report (consultation paper) of the 200,000 t/a maleic anhydride (MA) project of Wanhua Chemical was made public, indicating the company's intention to enter the PBS industry.
- On 22 March, 2022, investment proposals to set up projects of methylene diphenyl diisocyanate (MDI) separation and 1,4-butanediol (BDO) produced based on route using propylene, at the base in Ningdong County of Ningxia Hui Autonomous Region, was carried forward by Wanhua Chemical.
- On 22 March, 2022, the EIA details of Wanhua Chemical Sichuan's 75,000 t/a PLA integrated project were disclosed. This project aims to introduce new capacity at the high-tech industrial park of Meishan City, Sichuan Province.

Wanhua Chemical's business development in PLA and PBAT, two mainstream degradable plastic products, may have synergistic effects and become new growth points for the company. Notably, Wanhua Chemical has developed a series of modified biodegradable materials applicable to film blowing, film spraying, straw making, foaming, etc., during its studies on modification technologies of degradable materials using its R&D platform.

- In 2018, Wanhua Chemical formed an R&D team with over 100 members who resolved key challenges in lactide synthesis two years later and put the PLA project into trial-scale production.
- In Aug. 2020, Wanhua Chemical and Tianjin University of Science & Technology established a joint institute of biology to develop a homemade technology for lactic acid (LA) monomer manufacturing and to open up links throughout the PLA industrial chain.
- In March 2021, Wanhua Chemical closed (phase I) construction and started operations at its global R&D centre and headquarters base. This location focuses on R&D projects related to PBAT and BDO.
- In Aug. 2021, the Daxie Development Zone Wanhua Ningbo High-performance Materials Research Institute passed the construction stage and entered into operation with R&D focus on programmes for PBAT and PLA fully biodegradable materials and the innovation of whole biodegradable materials designed for garbage bags and straws.
- In Dec. 2021, Wanhua Chemical inked a deal with Shandong Baifei Mark Biotechnology Co., Ltd. to develop a biodegradable agricultural film demonstration project in Shouguang City, Shandong Province. The two sides will, taking the growth needs of crops planted in vegetable plastic greenhouses into account, cooperate in a degradation and recycling industrial chain demonstration project that involves a wide range of products, namely, biodegradable resin, biodegradable modified materials, biodegradable agricultural film and agricultural products, and compost.

### **Bio-based projects of Jinzhu New Material and Panda New Material publicised**

Summary: In mid-Jan., the EIAs of Jinzhu New Material's project of 300,000 t/a bio-based new material and 50,000 t/a fibre moulding, and Panda New Material's project of 600,000 t/a bio-based new material were publicised on local government websites.

#### **Anhui Jinzhu Biobased New Material Co., Ltd. (Jinzhu New Material)**

In 11 Jan., the consultation paper of the environmental impact assessment (EIA) of the 300,000 t/a bio-based new material and 50,000 t/a fibre moulding project of Jinzhu New Material, was publicised for the second time.

#### **Overview of the 300,000 t/a bio-based new material and 50,000 t/a fibre moulding project**

- Construction nature: New construction
- Executive body: Jinzhu New Material
- Total investment: USD320.25 million (RMB2.02 billion)
- Area: around 20 ha





- Location: Economic Development Zone of Yeji District, Lu'an City, Anhui Province
- Product scheme: Bamboo-based fibre, additives manufactured with 3D printing, fibre moulding
- Construction content: 300,000 t/a bio-based new material production line, 50,000 t/a fibre moulding production line, production workshops, office buildings, warehouses and accessory occupancy. Thereinto, the phase I construction includes lines for 100,000 t/a of bio-based new material and 10,000 t/a of fibre moulding.

This project introduces an advanced and green technology of ultrasonic airflow separation, and sources bamboo resources and leftover materials—which abound in Liu'an City and its neighbouring regions—as raw materials to produce bio-based new materials applicable to manufacturing of medical materials, green packing, sanitary filters. Its affiliate product macromolecular lignin with high purity, can be used as basic material for 3D printing, food and medical additives.

Incorporated in Sept. 2021 with a registered capital of USD15.87 million (RMB100 million), Jinzhu New Material mainly engages in business of bio-based new materials, 3D-printed additives, and fibre moulding products. The corporate has developed a highly valuable non-polluting technology that resolved the traditional problem in bamboo separation.

### **Sichuan Panda New Material Technology Co., Ltd. (Panda New Material)**

In 14 Jan., the EIA of the 600,000 t/a bio-based new material project (phase I) of Panda New Material was first posted on the website of Ecology and Environment Bureau of Tianquan County, Ya'an City. This project is designed to industrialise the local bamboo resource in an effective manner.

### **Overview of the 600,000 t/a bio-based new material project**

- Construction nature: New construction
- Executive body: Panda New Material
- Total investment: USD507.82 million (RMB3.2 billion)
- Location: Sichuan Tianquan Economic Development Zone in Tianquan County, Ya'an City
- Main product scheme: Bamboo-based fibre materials
- Construction content: 600,000 t/a bio-based new material line over three phases with phase I construction including 100,000 t/a bio-based new material production line
- Key production technique: Green ultrasonic airflow separation

Panda New Material was established in 5 Jan., 2022 with a registered capital of USD39.67 million (RMB250 million), and occupies an floor area of 60 ha (600,000 m<sup>2</sup>). This project, executed by Panda New Material, is invested by Jiangxi Zhongzhu Biomass Technology Co., Ltd. who also has a 300,000 t/a bio-based new material (200,000 t/a fibre-based new material and 100,000 t/a graphite-based new material) project under construction, the first phase (50,000 t/a new material) and the second phase (100,000 t/a new material) of which have entered operation.



## Price Update

TABLE 2: Average market prices of major raw materials of bio-based materials in China, Jan.–March 2022

No.	Product	Price, USD/t
1	Sugarcane	116.50
2	Corn	409.64
3	Wheat	466.75
4	Bagasse	54.79
5	Corn cob	126.35
6	Wheat straw	76.83
7	Corn stover	78.12

Source:CCM

TABLE 3: Average ex-works prices of major bio-based materials in China, Jan.–March 2022

No.	Product	Price, USD/t	Remark
1	PHA (Polyhydroxyalkanoates)	9,612	Films
2	PBS (Polybutylene succinate)	6,835	Extrusion grade and injection moulding
3	PPC (Propylene carbonate)	3,767	Injection moulding
4	PLA (Polylactic acid)	3,916	Injection moulding
5	PVA (Polyvinyl alcohol)	3,247	Flocculent
6	Starch-based material	3,476	Film moulding
7	PTT (Polytrimethylene terephthalate)	4,443	Fibre

Source:CCM



## Brief News

### Bluepha completes third Series B funding round

On 10 Jan., Beijing Bluepha Microbiology Technology Co., Ltd. (Bluepha) announced completion of the third Series B funding round as part of its Series B financing totalling USD238.04 million (RMB1.5 billion) to date. This latest funding round is co-led by Genesis Capital and China State-owned Enterprise Mixed Ownership Reform Fund Co., Ltd. and joined by multiple established investment companies and Bluepha's equity holders.

Use of proceeds of Series B financing:

- Construction and operation of biodegradable polyhydroxyalkanoates (PHA) material industrial production equipment
- Development and deployment of Industry 4.0 SynBio OS (Synthetic Biology Operating System)
- R&D and construction of new product lines relating to regenerative medical materials, engineered probiotics, etc.

Recently on 1 Jan., Bluepha started up construction work of its PHA industrialisation project targeting at 25,000 t/a of production capacity. The company has developed technical reserve for PHA production involving R&D of bacterial strains, biotransformation, separation and purification, material modification, etc., and owned the relevant intellectual properties. Its products have been tested and approved by companies in Global 500, and won numbers of orders or intentions.

It has established strategic partnerships with corporates from major countries and regions when expanding its international PHA business. That includes the cooperation with Thailand-based listed company ThaiWah Public Company Limited and Canada-based company Genecis Bioindustries Inc., and in most recent days, the tie-up with Helian Polymers from the Netherlands for dual PHA business expansion in the European market, improvement and commercialisation of PHA material products, as well as solution & service of degrading bio-based materials in the marine environments for end-users.

### Weigou Workshop closes RMB250 million Series A funding round

On 17 Jan., Beijing Weigou Workshop Biotechnology Co., Ltd. (Weigou Workshop) closed a USD39.67 million (RMB250 million) Series A funding round, which was led by China State-owned Enterprise Mixed Ownership Reform Fund Co., Ltd. and followed by other renewed investment institutes. Adding this round of fundings, the company has secured an aggregate of USD47.61 million (RMB300 million) financing money.

Weigou Workshop says it will set up an international R&D headquarter of biodegradable material PHA in Shunyi District, Beijing, put a 1,000 t/a PHA high-efficacy and intelligent demonstration production line into operation, and plan and construct a 10,000 t/a PHA production base at the same time.

Established in Feb. 2021, Weigou Workshop is an embodiment of the technological achievements of China's Tsinghua University, focusing on R&D and application of innovative synthetic biotechnology. Leveraged with 30+ patented technologies developed by Prof. Chen Guoqiang's team of Tsinghua University, Weigou Workshop has managed to develop pipelines of green biodegradable materials,





chemical intermediates, enzymes for industrial use, and technology for industrialisation of PHA and its series products.

Notably, Weigou Workshop innovated a PHA production scheme via restructuring of halophilic production strains to better control input cost. There are three key technical advantages of this new scheme: continuous fermentation technology that allows key strains (*Halomonas* spp.) to grow contamination free under open and unsterile condition, "self-flocculation and self-settlement" in morphology-controllable engineering and key downstream technology for multiple-use of wastewater from fermentation—all regarded as world-leading PHA production technologies.

### **Jingliang Longjiang's 50,000 t/a LA project comes onstream**

On 19 Feb., Jingliang Longjiang Biotechnology Engineering Co., Ltd. (Jingliang Longjiang) announced its 50,000 t/a L-Lactic acid project (phase I) closed construction stage and entered operation.

Overview of the L-Lactic acid and polylactic acid (PLA) project

- Phase I project: The commencement of construction of a 50,000 t/a L-lactic acid production line and equipment and facilities such as raw material warehouse, wastewater treatment system and office facility, was in March 2021. This phase is invested with USD87.28 million (RMB550 million).
- Phase II project: The commencement of construction of a 50,000 t/a L-lactic acid production line and a 40,000 t/a PLA production line—representing almost 70,000 t/a of L-lactic acid processing capacity—is scheduled in 2022. This phase will be invested with USD158.69 million (RMB1.0 billion).

Jingliang Longjiang's L-lactic acid is made based on corn starch. In addition to effectively addressing the company's limit in starch drying and excessive capacity of starch emulsion, this production launch can turn primary corn deep-processing products into value-added LA products that circulate in longer industrial chain.

Incorporated in Sept. 2016 with a registered capital of USD63.48 million (RMB400 million), Jingliang Longjiang is owned by Jingliang Biotechnology Group Co., Ltd. It brought forward this new L-lactic acid production line construction plan in 2021 spurred by its well operational 1,000,000 t/a corn deep-processing project (phase I), stretching its product mix of foods to degradable materials.

### **GS Biotech reaches over one tonnes of FDCA supply agreement**

Recently, GS Biotech signed up a agreement involving over one tonnes of 2,5-furandicarboxylic acid (FDCA) supply to downstream buyers. It is so far, the biggest FDCA sales contract in China in terms of supply amount, and plays a critical role in the market of 5-hydroxymethylfurfural (HMF) downstream bio-based materials.

FDCA is a bio-based dibasic acid and a HMF platform chemical for the production of bio-based materials in the lower-reaches industries, notable for its application for obtaining polyethylene furanoate (PEF) using ethylene glycol (EG) in polymerisation. In comparison with the traditional petroleum-based material polyethylene terephthalate (PET), PEF is superior in gas barrier, water barrier and thermal properties, and is hailed as one of the most potential monomers in the sector.







GS Biotech suggested target to achieve over 100 tonnes of FDCA sales this year. That means the market should expect launches of new types of materials in a prompt manner and a responsive expansion of the downstream industries.

**Company dynamics and achievements:**

- GS Biotech has accomplished development of continuous HMF production processes and has scalped up HMF industrial capacity up over 1,000 t/a in less than 1 year since its establishment in July 2021.
- Looking out for 2022, the company plans to develop technologies and demonstration production platforms that integrate the whole industrial chain ranging from biomass raw materials to end products.
- Meanwhile, GS Biotech is moving to diversify its bio-based product categories and aims to launch its developing cost-effective degradable plastic products in large quantities by the end of 2023.
- It has worked with XtalPi Inc., a computing-driven pharmaceutical R&D company, on innovation of new bio-based materials with the help of high-throughput "artificial intelligence plus" (AI+) robots, in order to maximise the efficiency and accuracy in developing HMF derivatives.
- Note that in recent 3 months, GS Biotech has completed two angel financing rounds, each worth over RMB10 million. The proceeds will be used in expediting the R&D, production construction and improvement of HMF derivatives.

**Site change of Haichuangda's 150,000 t/a PLA project**

On 14 Feb., Zhejiang Haichuangda Biomaterials Co., Ltd. (Haichuangda) applied for approval for relocating its 150,000 t/a polylactic acid (PLA) project (investment project).

**Project overview**

- Construction nature: New construction
- Construction unit: Zhejiang Haichuangda Biomaterials Co., Ltd.
- Site (after): Economic Development Zone of Toumen Port, Zhejiang Province
- Total investment: USD190.17 million (RMB 1.23 billion), USD4.16 million (RMB26.90 million) of which is for environmental protection
- Area: 74,883 m<sup>2</sup>
- Working system: 300 employees working for 330 days per year (8,000 hours)
- Production capacity: 150,000 t/a of PLA and its by-products, and 16,000 t/a of lactic acid (LA)
- Construction period: 24 months

The Nanyang Area where the project will sit in, is in a distance of major ecologically sensitive region, concentrating pharmaceutical & chemical industries like active pharmaceutical ingredient (API) and preparation, biomedicine, new material.

On 11 June, 2021, this project was approved by the Ecology and Environment Bureau of Taizhou City, Zhejiang Province, started construction on 25 June, 2021, and was set for trial in May 2023 originally. On 28 Oct., 2021, the company suspended project construction to avoid unnecessary expense of investment under consideration of this change. It is said that after site change, the project will resume construction work, and complete trial production in June 2024, one year behind its original schedule.





## **"Large-scale Preparation and Application of High-quality PLA Fibre and Its Textile Products Project" passes comprehensive performance assessment**

In Jan., the "Large-scale Preparation and Application of High-quality Polylactic Acid (PLA) Fibre and Its Textile Products Project", listed into the key R&D programme of China's "13th Five-year Plan", passed the comprehensive performance assessment which was conducted by the Ministry of Science and Technology. This project was initiated and has been implemented for more than 4 years since 17 Nov., 2017, led by Hi-tech Fiber Group Corporation, a subsidiary of China National Machinery Industry Corporation (Sinomach), and jointed by 16 units such as Donghua University and East China University of Science and Technology.

Part achievements of the project:

- Setup of high-efficacy and cost-effective 10,000 t/a corn-based lactic acid (LA) and lactide demonstration production line and 1,000 t/a straw-based LA pilot-scale production line;
- Setup of 10,000 t/a continuous polymerisation and spinning demonstration production line;
- Development of PLA fibre preparation processes that feature heat resistance, hydrolysis resistance, solution dyeing, etc., and establishments of 30,000 t/a polylactide staple fibre and 15,000 m<sup>2</sup>/a PLA fibre/flax fibre composite board production line.

The project focuses are on transferring fibres and other petroleum-based products to bio-based carbon to cut CO<sub>2</sub> emission; exploiting the characteristics of PLA materials to develop bacteria-resistant products, sanitary non-woven fabrics, packaging non-woven fabrics, beddings, curtains, carpets, etc.; and improving technology innovation in areas of PLA and bio-based materials to expand and advance bio-based and degradable materials industry.

### **Langjing New Material's 1,200 t/a lactide and 1,000 t/a PLA product pilot line approved**

On 10 Jan., Shandong Langjing New Material Technology Co., Ltd. (Langjing New Material)'s project construction of a 1,200 t/a lactide and 1,000 t/a polylactic acid (PLA) product for medical use pilot line was granted approval from the Administrative Examination and Approval Authority of Zhangdian District, Zibo City, Shandong Province.

The project closed the first phase of construction of 100 t/a "lactic acid—lactide—PLA" pilot production line and put it into production at the start of 2021; the second phase is to set up a 1,200 t/a lactide and 1,000 t/a PLA product production line in its existing plant—aiming to reach capacity up to 30,000 t/a as a whole.

Founded in Nov. 2021 in Zibo City, Shandong Province, Langjing New Material is wholly-owned by Beijing Langjing Huiming Biotechnology Co., Ltd. (Langjing Huiming). Langjing Huiming has developed and possessed the core technologies for PLA production and processes for production of an assortment of PLA modified materials:

- In 2013, Langjing Huiming gathered a PLA R&D team and tied up with Shanghai Industry Animalcule Research Institute and Jiangnan University, in order to tackle down difficulties in industrialisation of D-lactic acid and PLA;
- In 2018, the company constructed a high-gloss pure D-lactic acid pilot line adopting new production processes;
- In May 2021, its R&D team overcame difficult problems in PLA production using homemade technologies, and developed a complete set of high-gloss pure D-lactic acid industrial production technique which is known as "two-step" approach.



**Journalist : Huoyin Tan**  
**Editor : Fengyi Yan**  
**Chief Editor : Xiaodong Qu**  
**Publisher : Kcomber Inc.**

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17th Floor, Huihua Commercial & Trade Building, No.80 XianlieZhong Road Guangzhou, 510070, P.R.China

**Tel: +86-20-37616606**

Fax: +86-20-37616768

E-mail: [econtact@cnchemicals.com](mailto:econtact@cnchemicals.com)

Website: [www.cnchemicals.com](http://www.cnchemicals.com)