



Up-cycled Rice-based Plastics

 **Rice Resin**®

© All rights reserved by Biomass Resin Holdings Co., Ltd. 2022

Presenter: Saya Masuda  
Manager, Bioplastics Department  
Industrial Materials Business Unit  
Mitsui & Co. Plastics Ltd.



↑ On-Line Namecard

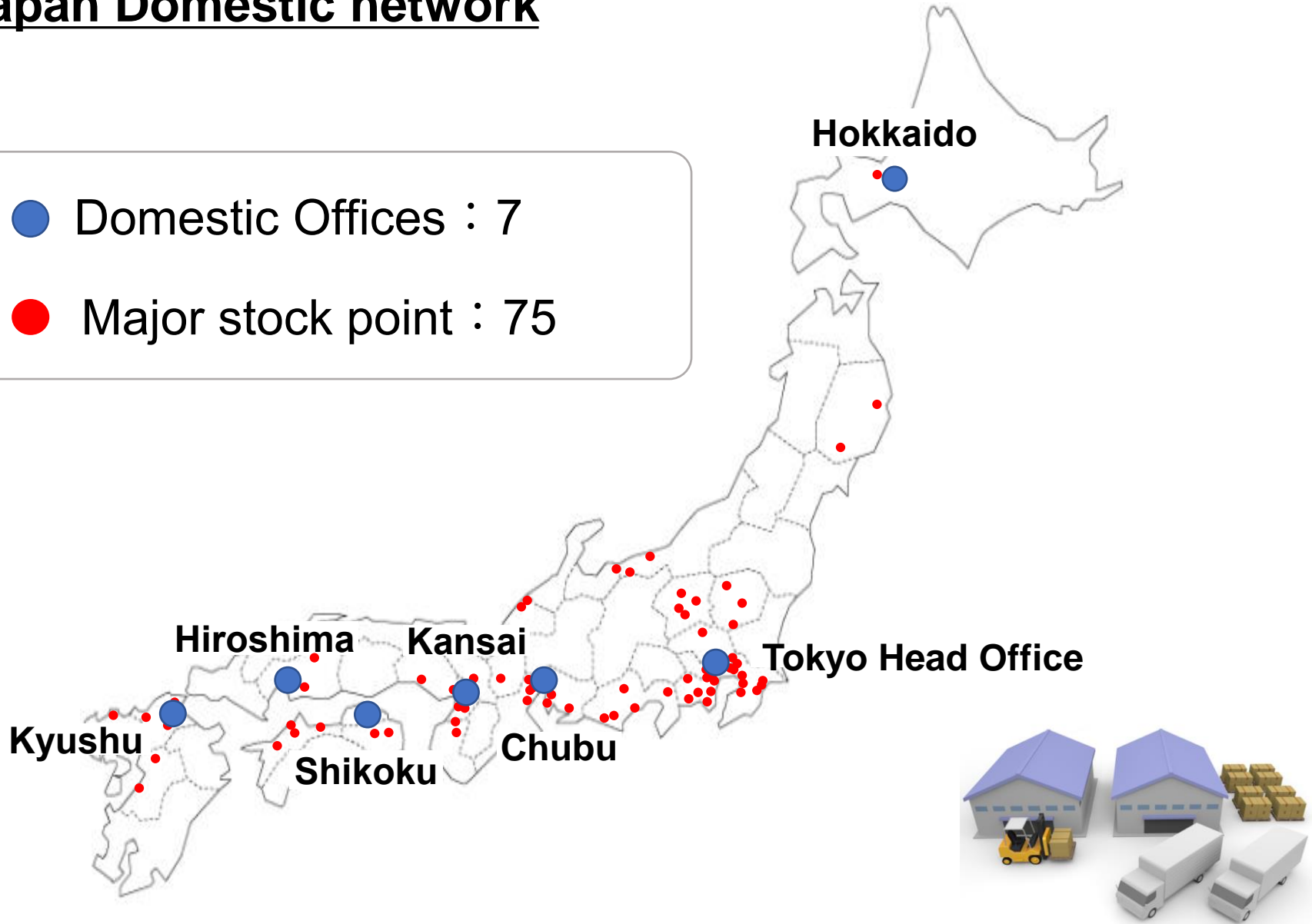
**Sustainable Plastic Innovation for Tomorrow**

## Corporate Outline

<b>Corporate Name</b>	Mitsui & Co. Plastics Ltd.
<b>Established</b>	August 1947
<b>President</b>	Katsunori Mori
<b>Paid-in Capital</b>	626 million yen ≒ EUR 4.47 million.
<b>Shareholder</b>	Mitsui & Co., Ltd.(MBK) 100%
<b>Number of Employees</b> (As of 1 <sup>st</sup> April 2022)	601
<b>Consolidated Net Sales</b> (March 2022)	313,100 million yen ≒ EUR 2,236 million
<b>Business Accounts</b>	➤ Supplier : 1,700 ➤ Customer : 3,100

# Japan Domestic network

- Domestic Offices : 7
- Major stock point : 75



# Mitsui Group Global network

(As of 1st Apr., 2020)



● Overseas representatives : 10 in 6 countries

# Bio Plastic List-1 「Biodegradable Polymer」

		Resin name	Abbreviation	Plant-based	No.	Company name	Brand name	Capacity	Handle by MBP	Comment
Biodegradable Polymers	Poly lactic acid	Poly Lactic Acid	PLA	○	1	Natureworks	Ingeo	158kty		NW is the biggest PLA manufacturer in the world. They are under the plan of increasing another line in Thailand. Capacity is expected to around 75kty.
					2	Total Corbion	Luminy	75kt	○	TC started to run the line from Dec in 2018 in Thailand. They are 2nd biggest PLA manufacturer in the world. TC are planning to run a new 100kty plant in France in 2024.
					3	Changchun Haizheng Biology Material	Revode	15kty	○	They started the 15kty new plant in 2019. There are sole sales agent in JAPAN names Daishin Pharma-Chem.
					4	Synbra	Synterra	?		Unknow their detail.
		Modified Poly Lactic Acid	-	○	5	UNITIKA	TERRAMAC		○	UNITIKA are developing PLA compound, film ,sheet, fiber and so on.
					6	MITSUBUSHI CHEMICAL	ECOLOJU(sheet)) PLABIO(shrink)		○	PLA based SHEET and Shrink. Their product is used for the application of point card, bottle-shrink , envelope window frame and so on.
					7	MINIMA		4kty	○	They Manufacturing biodegradable compounds according to the molding method. Also manufactures various finished products such as cutlery, bags, and paper laminate products. Widespread adoption by major end users EX Starbucks.
					8	Asahi kasei	ECORISE		○	Asahi Kasei manufactures the Nonwoven fabric and Fiber made from PLA.
					9	Toray	Ecodear			Toray produces PLA compound. Their grade are focusing on the OA equipment which needs high heat resistance.
	Other Biodegradable	Poly butylene succinate	PBS	partially○	10	MITSUBUSHI CHEMICAL PTT MCC Biochem	Bio PBS	20kty	○	They started new operation from 2016 in Thailand. Capacity is 20kty. Biomass ratio of their Resin is around 40~50%. The main application is agriculture mulch film and compost garbage bag.
		Poly butyrate Adipate Terephalate	PBAT	-	11	BASF	Ecoflex Ecovio(PLA compound)	74kty	○	Physical property or PBAT is similar to PBS. BASF are also supplying the PBAT and PLA compound named "ecovio".
					12	Zhuhai Wantong Chemical (King fa group)	Ecobond	20kty	○	They belongs to King fa group. They have also the compound grade with PLA. They are planning to increase capacity from 20kty to 40 kty in 2020.
					13	CCP		10kty	○	They belongs to Chang chun group in Taiwan. Started PBAT mass production from Aug in 2020. Also planing to produce PBS in the future.
					14	Novamont	MATER-BI	10kty	○	Novamont is developing compound grade blended PBAT and thermoplastics starch. GSI Creos is the Sole sales agent in Japan.
		15	Tunhe		5kty		Miyako Kagaku (CHORI group) is sale window in Japan.			
		copolymer of 3-Hydroxybutyrate and, 3-Hydroxyhexanoate	PHBH	○	16	Kaneka	PHBH	5kty	Depend on the case	PHBH is plants-based biodegradable polymer and good marine biodegradability. It has the OK Marine biodegradable certification. Started to produce PHBH by 5KMT from 2020. Planning to increase capacity from 5KMT to 20 KMT in near future.
		Polycaprolactone	PCL	-	17	Daicel	PLACCEL	hundres ty	○	It Characterized by good marine biodegradability and biocompatibility. It is also used in many applications such as plasticizers for modifying polyurethane and hot melts. There are many application by blending with other biodegradable polymer. Since the melting point is as low as 60 ° C, they are developing new applications.
		Cellulosic biopolymers	-	Partially○	18	Kuraray	EARNESTON		○	Kuraray is developing as new brand which will be anticipated for fishing application.
					19	NEC	Necycle	hundres ty	○	High-function bioplastics. It has good Endurance. It has a long time degradability in Marine for 4 or 5 years. Biomass ratio is 50%. Jet-black shiny surface is feature. Planning to increase production capacity within few years.
		20	Daicel	CAFBL0		○	Special features is excellent bidegradable in Marine. Daicel is going to get a certificate for "OK MARINE biodegradable".			
		Polyglycolic acid	PGA	○	21	Kureha	KUReDUX	4kty		Production plant is located in USA. Kureha is only PGA mass production supplier of PGA. Very high heat resistance and high strength is the charactaristic. It is often used as an excavation material for shale gas.

# Bio Plastic List-2 「Bio based Polymer」

		Resin name	Abbreviation	Plant-based	No.	Company name	Brand name	Capacity	Handled by MBP	Comment
plants-based	Other Biopolymers	Polytrimethylene terephthalate	PTT	○	1	Dupont	Sorona	50kty		One of the raw material is biomass 1,3-POD. This biopolymer has the physical property of PET and PBT.
		Polyamide	PA	○	2	Arkema	Hiprolon Rilsan			Polyamide 11, 610, 1010, 1012.
					3	Evonik	VESTAMID Terra			Polyamide 610, 1010, 1012.
					4	BASF	Ultra Mid S Balance		○	Polyamide 610.
					5	Dupont	Zytel RS			Polyamide 610, 1010.
					6	DSM Engineering Plastic	ECOVACS			Polyamide 410.
					7	Toray	AMILAN		○	Nylon 610.
		Isosorbide polymers	-	○	8	MITSUBISHI CHEMICAL	DURABIO	5kty	○	DURABIO is plants-based polymer, which made from isosorbide and gricol. This material has the good properties of both PC and PMMA, as bio-engineering plastic. Its feature is high gloss appearance and high transparency.
		Polyethylene furanoate	PEF	○	9	Avantium	yxy	10ty		PEF (YXY) is a 100% biomass polyester resin polymerized by bio-based FDCA and bio-based MEG. PEF is a resin similar to PET and can be an alternative. Bio-PET'S biomass ratio is 30%, while PEF is 100% so it is expected as a substitute material for bio-PET. It is also characterized by its superior barrier properties compared to PET.
	Bio-PE	Bio-polyethylene	PE	○	10	Braskem	Green PE	200kty		Geen PE is bioethanol based 100% biomass Polyethylene. Braskem is only one supplier of BIO PE. Toyota Tsusho and Sojitz are Braskem's sale window in Japan.
	Bio-PET	Bio-polyethylene terephthalate	PET	○	11	Lotte Chemical Chung-Shing Far Eastern New Century Bunshiro				Bio PET is a biomass ratio of 30%, which is produced by biomass MEG and petroleum PTA. Bio-PET can be produced by current PET polymerization equipment. AnneloTech in the United States is developing 100% biomass-derived PET, and Suntory has invested from Japan.

# Bio Plastic List-3 「Compound with Natural Source」

		Resin name	Abbreviation	Plant-based	No.	Company name	Brand name	Capacity	Handled by MBP	Comment
Natural compound	Limestone	Limestone compound		○	1	TBM	LIMEX			TBM is developing compound by limestone as materials.
	Old rice	Old rice compound		○	2	Minamiuonuma Biomass Resin	Rice Resin	4kty	○	Rice Resin sells compound blended with old rice which is seeded in Niigata. Their product has been adopted as Municipal garbage bags, chopsticks for novelty, Japan Post Bags and so on. They are going to increase another a new line by 5kty in KUMAMOTO.
		Old rice compound		○	3	Biopoly Joetsu				
		Old rice compound, Rice		○	4	Shiraishi biomass				Shiraishi Biomass is developing compound blended polyolefin resin with rice husk and rice.
	Starch	Thermoplastics starch, Glycerin		○	5	Bio LogiQ		10kty		Bio LogiQ's raw materials is starch has been made in American. China plant will start to produce 5kt from 2020. Even though their starch basically cannot be sold for outside it still has possibility as partner if making a contract.
		Thermoplastics starch		○	6	Kuraray	PLANTIC		○	PLANTIC made by starch is similar with EVOH that has barrier function. It has been adopted for food packaging in America and Australia. Multi-sheeted is also based on starch with solubility so it could be recycling.
		thermoplastics starch, Glycerin		○	7	Sankyo Chemical Industry				This is thermoplastic starch compound. NishinoKinryo is sale window.
		Thermoplastics starch		○	8	Kobayashi	Reseam ST		○	They are manufacturing a sheet tray that used by compound containing 51% starch as a raw material. It is used for the inner tray of "Shiroi Koibito".
		Cassave ,Starch		○	9	AVANI				AVANI produces bags by Cassave starch. Compound cannot be sold because the molding know-how is necessary. Just only product can be sold.
		Thermoplastics starch		○	10	JAPAN CORN STARCH				It is big starch company in Japan and developing product which can be dissolved with biodegradable resin.
	Eggshell, other	Food , coffee etc		○	11	Amica-Terra			○	Amica-Terra has a plant in Taichung of Taiwan.They use various material which is Bamboo, Starch and so on.
		Eggshell		○	12	SAMURAI TRADING		260kty (eggshell based)		SAMURAI trading produces the compound PP and traceable eggshell. Their product has already been applied for injection molding and extrusion molding. They have connection with VEGETECH and Kobayashi, and are developing with these companies.
		Palm palm shell, Chaff		○	13	TEXCHEM	TEXa	2.5kty	○	TEXa product is compounded with PP and non-foodable biomass. It focuses on the injection molding.
		Bamboo, Eggshell, Coffee, Bamboo grass etc.		○	14	SANWA SHOKAI	NEQAS	3.6kty	○	SANWA SHOKAI is plant equipment manufacturer. They started biomass business from 2010. They have their own patent for Two-axis extruder and also supply biomass materials as their brand "NEQAS".

# Business Alliance with Biomass Resin Holdings From March, 2021

<https://www.mitsui-plastics.com/en/news/152/>

## Scope:

Business expansion support  
both in Japan and overseas



## Production Capacity

**10,000ton/year**

Because we can grow Rice  
everywhere in Japan,  
we can have many production  
factories and bases.

### Biomass Resin Minamiuonuma

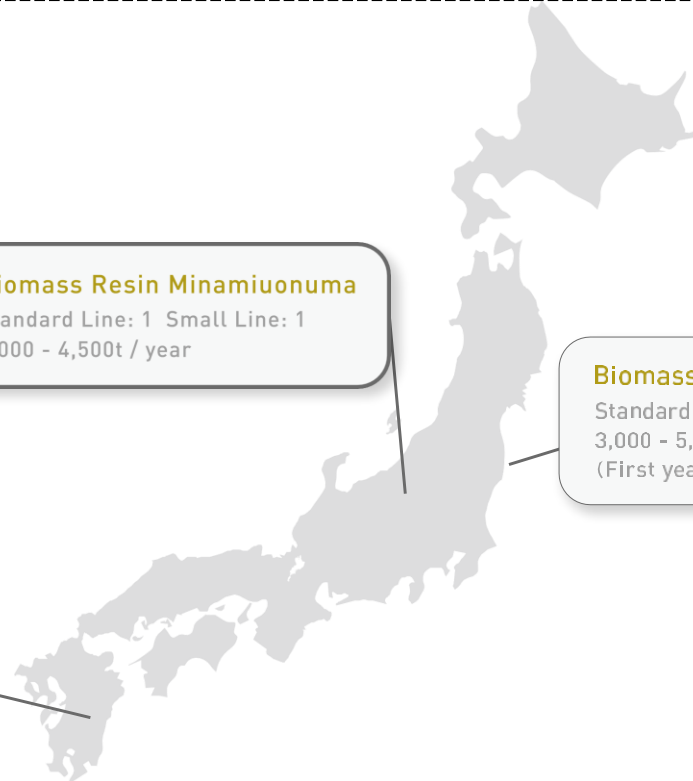
Standard Line: 1 Small Line: 1  
3,000 - 4,500t / year

### Biomass Resin Fukushima

Standard Line: 2  
3,000 - 5,000t / year  
(First year 1 standard line)

### Biomass Resin Kumamoto

Standard Line: 3 5,000 - 10,000t / year  
(First year 1 standard line)





# What is Rice Resin?

## Rice Resin

“Rice Resin” is a Japanese biomass plastic made by collecting rice that is scheduled to be discarded (crushed rice, damaged rice, old rice, etc.) and upcycling them as a raw material for rice-based plastic resins.

un-sellable Rice



Rice Resin



Up-cycle with our Technology



It is possible to mix up to 70% rice, which significantly reduces the content of petroleum-based plastics.

© All rights reserved by Biomass Resin Holdings Co., Ltd. 2022

Sustainable Plastic Innovation for Tomorrow

# Sold more than 1 million sets of Rice Block Toys for Babies in Japan

↑ These are Rice Resins ↓



These toys contain **51% of Rice** as material!



© All rights reserved by Biomass Resin Holdings Co., Ltd. 2022

Sustainable Plastic Innovation for Tomorrow

# Rice Resin products in the Market

© All rights reserved by Biomass Resin Holdings Co., Ltd. 2022



**People**

Rice Resin  
Block toys

Famous for Safe and Secure toys in the major retailers in all over Japan



**JP POST 日本郵便**

Rice Resin  
Shopping Bags

Expanding at convenience stores, supermarkets, and specialty stores nationwide



南魚沼市

Rice Resin  
Municipal  
Garbage Bags

Already testing in Niigata city. Also city of Kumamoto, Kyoto, Yokohama and others are under discussion of using Rice Resin bags



Rice Resin  
Chopsticks

Popular chopsticks that can be used for meals without spoiling the original flavor of rice



Rice Resin  
Clear Files &  
Stationery

Rice Resin Files were used for tourism promotion in Niigata

※ In addition to these products, we have manufactured a cumulative total of more than 800 Rice Resin products in Japan.

## Sustainable Plastic Innovation for Tomorrow

# Rice Resin products in the Market

## お箸



20%

お米のお箸で  
ご飯を美味しく

## おちょこ



51%

お米のおちょこで  
日本酒を美味しく

## クッキングセット



21%

滑り止め付きで扱いやすく  
食洗器にも対応しています

## スプーン



34%

持ちやすく食べやすい  
ユニバーサルデザイン

## うちわ



10%or  
20%

うちわの骨の部分に  
ライスレジンを使用

## おもちゃ



51%

高い安全性と  
優しい風合いが特徴です

## SDGs バッジ



51%

意識向上などを目的として  
多くの方々にご好評です

## レターカッター



51%

自然由来のマットな手触りが  
特徴です

## クリアファイル



10%

透明度が高く  
視認性が良好です

## ボールペン



10%

なめらかな質感と  
書き心地が特徴です

# Rice Resin products in the Market

ごみ袋

レジ袋

ショッパー

アメニティ

ストロー



焼却時に発生するCO<sub>2</sub>を削減できます

バイオマス率 25%の為  
有料化対象外のレジ袋です

バイオマス率 25%の為  
有料化対象外のレジ袋です

使い捨てプラスチックを  
20～35%削減できます

使い捨てプラスチックを  
20%削減できます



イベント時配布用ショッパー



環境NPO 活動時のごみ袋



テレビ局 活動時のごみ袋



入場ゲートで配布するごみ袋に採用されました

# Our Aim

## 1. Rice Resin Sales Expansion

We can export Rice Resin itself as well as Rice Resin products.

**We are looking for sales partner and/or end users to expand our product sales.**

## 2. Produce biomass compound with Polyolefin and organic materials of regional crops

Our strength is “ to compound with organic materials in higher contents”.

Utilizing our Rice Resin technology,

We are good at compounding with polyolefin and organic materials.

Example: Biomass resins has experienced;

wood powder, coffee husks, sesame husks, rice husks, bamboo, cassava, etc



Pictures are provided by PIXTA

**We are looking for partners and collaborators across the world.**



# Sustainable Plastic Innovation for Tomorrow

Representing Asia

Ecology × Agriculture Company

Aiming to be a company that is  
needed for 100 years in the world and loved for 100 years

We are looking for partners and collaborators across the world.

Thank you for your time and see you soon!



## Further information:

### Website:

[http://www.unido.or.jp/en/technology\\_db/9968/](http://www.unido.or.jp/en/technology_db/9968/)

[https://www.mitsui-plastics.com/biomass/riceresin\\_lp\\_en](https://www.mitsui-plastics.com/biomass/riceresin_lp_en)

### Contact us:

[https://ah111mu2q3.smartrelease.jp/biomass/riceresin\\_lp\\_en](https://ah111mu2q3.smartrelease.jp/biomass/riceresin_lp_en)