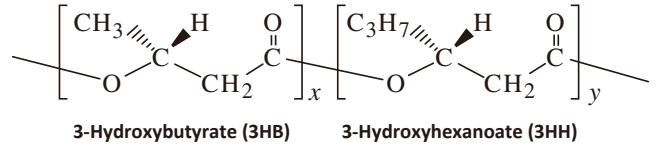
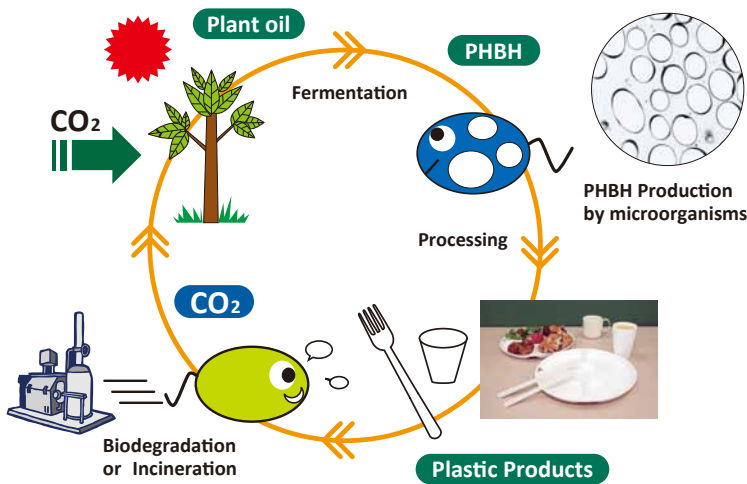


KANEKA Biodegradable Polymer PHBH

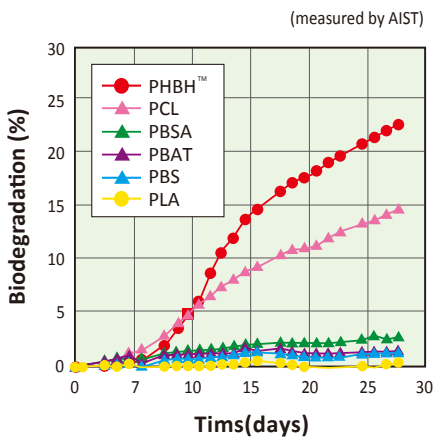
Life cycle of PHBH™



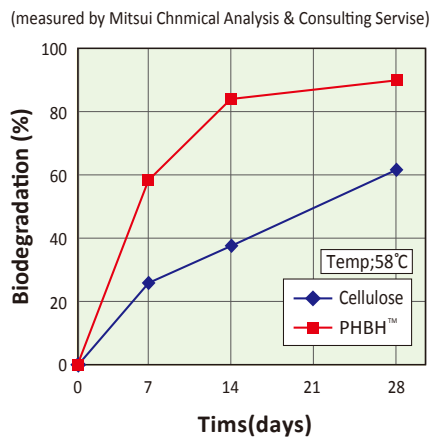
PHBH™ is produced by Kaneka's unique microbial fermentation process and is applicable to versatile biodegradable and durable applications. Our recent research shows that PHBH™ has excellent biodegradable behavior in marine environment, where it can contribute to reducing marine pollution by plastics.

Biodegradability

Aquatic (in sea water)

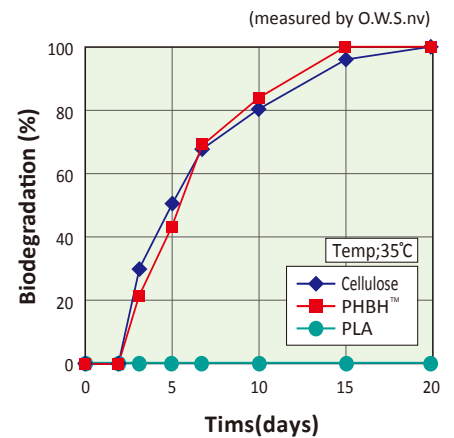


Compost (Aerobic)



ISO14855 (compost)

Anaerobic (Aqueous)

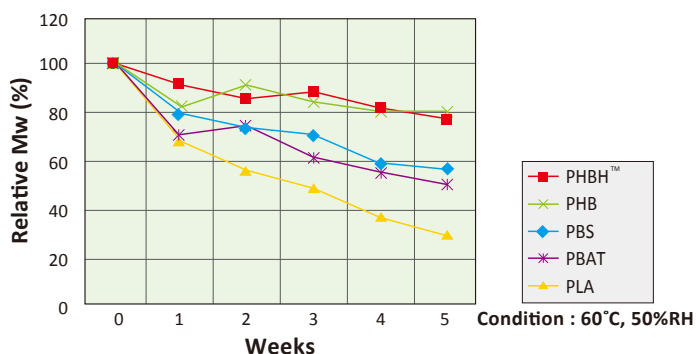


ISO14853 (aqueous phase)

Certification

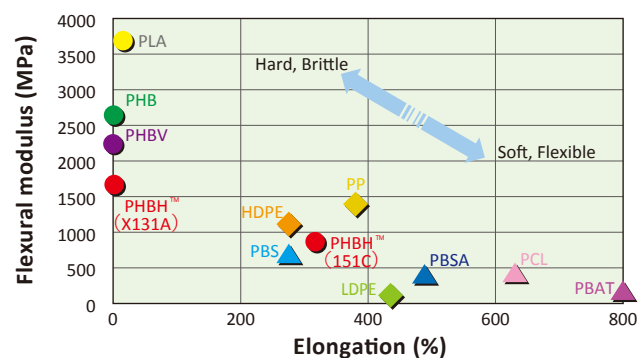
	Biomass	Biodegradation
EUROPE		
USA		Compost : Certified by BPI (ASTM D6400, 6868) Sea Water: Compliant with ASTM D7081
JAPAN		

Hydrolysis stability



PHBH™ has excellent hydrolysis stability in biodegradable polymers.

Modulus vs Elongation



PHB : Polyhydroxybutyrate
 PHBV : Polyhydroxybutyrate-co-hydroxyvalerate
 PBAT : Polybutylene adipate terephthalate
 PBS : Polybutylene succinate
 PBSA : Polybutylene succinate adipate
 PCL : Polycaprolactone

○ : Bio-based, biodegradable
 △ : Fossil-based or partly bio-based, biodegradable
 ◇ : Fossil-based, non-biodegradable

Physical Properties

Items	ISO	Unit	PHBH™			PLA	PBS	PBAT	HDPE
			151C	X131A	X331N				
Density	1183	g/cc	1.19	1.20	1.20	1.26	1.26	1.23	0.96
Melting point	(DSC)	°C	123	145	145	166	114	115	130
Glass transition temperature	(DSC)	°C	0	2	2	60	-32	-30	< -50
MFR (165°C 5kg)	1133	g/10mins	3	3	12	-	-	-	-

Mechanical properties (100µm T-die film)

Items	ISO	Unit	PHBH™		PLA	PBS	PBAT	HDPE
			151C	X131A				
Tensile elongation	527	%	325	4	17	280	800	280
Tensile strength	527	MPa	30	36	52	56	58	44
Tear strength / Elmendorf	6383-2	N/mm	4	3	4	7	56	15
Haze	14782	%	44	45	3	45	43	98
Humidity permeability*	JIS Z0208	cm ³ ·mm/m ² ·day·atm	1	5	18	19	25	0.3
Oxygen permeability*	JIS K7126	cm ³ ·mm/m ² ·day·atm	4	5	20	10	40	70
CO ₂ permeability*	JIS K7126	cm ³ ·mm/m ² ·day·atm	22	19	56	122	476	-

*Thickness: 60 µm

These are typical properties and are not to be construed as specifications.

KANEKA CORPORATION

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