



GO!PHA
Global Organization for PHA

The PHA Masterclass

Dedicated in-company workshops and event-oriented masterclasses



In 2020, **GO!PHA** launched the PHA Masterclass. The masterclass teaches you everything you need to know about Polyhydroxyalkanoate (PHA). The PHA masterclass provides a unique opportunity to learn about all aspects of PHA, from production to application and business development. We offer basic to advanced workshops, based on the background and preferences of participants, in the easiest and most enjoyable way. Join our masterclass and start advancing your knowledge.

We offer:

- In-company standardized masterclass (max.10 participants) at a fixed tariff
- In-company customized masterclass at variable tariffs
- Event-oriented workshops as part of a seminar program on selected dates at a fixed price per person

Pricing

The price of the masterclass depends on the outcomes of the consultation interview with one of our tutors. Your learning goals, needs and wishes determine whether a standardized or customized workshop fits best.

A 1-day standardized masterclass for a maximum of 10 participants:

- 6,000 Euro for Non-members
- 5,000 Euro for **GO!PHA** Members

A customized masterclass

- Price depending on the outcomes of the consultation

GO!PHA general terms & conditions apply.

Registration

Send your request to: gopha@gopha.org

Content

The following content is addressed during the standardized workshop:

- PHA manufacturing. Feedstock options and processing technologies.
- PHA polymers and compounds. PHA varieties, performance and combinations.
- Industry landscape. PHA manufacturing landscape, players and value chains.
- Applications and market segments
- Marketing and business development. Product price, premiums and marketing strategies
- Historical perspective and future outlook.
- "10 lessons learned"

PHA technology manufacturing cost calculator

PHA		Inputs		Outputs	
Plant Capacity	50 000 ton	100 t/d Crops	Carbon source	15 t/yr	2500 t/yr
Productivity	2.15 kg/m ³ .h	8000 hours operation	raw materials	31	625
Concentration	200 g/m ³	1 isolation factor	Utilities	11	63
Recovery yield	80%		Fixed costs	25	492
Reactor volume	360 m ³	180 m ³ volume per fermenter	Depreciation	50	250
Brch volume	312 500 m ³			70	3380
Carbon source: Oil	400 \$/ton	1.6 kg/kg stage	Recovery	24	476
raw materials	1000 \$/ton OME	0.1 kg/kg stage	Waste materials	0	0
Utilities	10 \$/m ³ brch				
Fixed costs	65 \$/m ³ brch		Total	83	1960
Depreciation	300 \$/m ³ brch				
Waste	0 (\$/ton included, brch excluded)				
Balance check					
Recovery		material	MMV	ton	
PHA	1	86	50 000		
Waste materials	0.29	44	14 824		
CO ₂	0.09	120	12 556		
Water		312 500			
C-source	67.2	78 125	88 800 m ³		
Reproduction	500				
Products	77 800				
Balance check					

Jan Ravenstijn - 9 August 2019

The PHA product platform is very diverse...

- ✓ scl-PHAs P3HB, P4HB, PHBV, P3HB4HB, PHB3HV4HV.

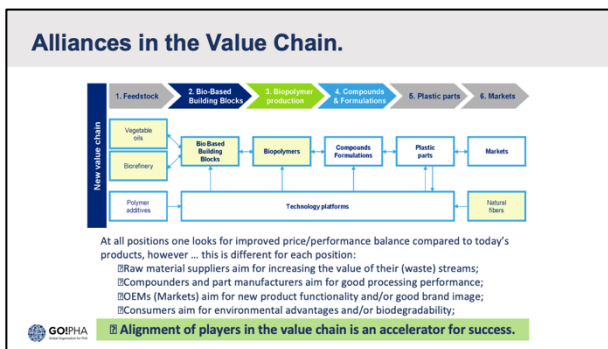
- ✓ mcl-PHAs PHBH, PHBO, PHBD.

- ✓ lcl-PHAs Many varieties possible.

scl: short chain length
 mcl: medium chain length
 lcl: long chain length

In addition PHAs have been designed with aromatic or C=C groups in the side chain.

Jan Ravenstijn - 9 August 2019



Demonstrated PHA applications (commercial)

- Medical and surgical applications e.g. Trafix (P3HB)
- Flexible packaging e.g. PHBV
- Sewage treatment e.g. Tanson
- Organic waste bags e.g. Ecomann (P3HB4HB)
- Stationery e.g. Map (P3HB)
- Food tray e.g. FKUR
- Exfoliating microbeads (scrub) e.g. Orka, Natigato (PHB)
- Plant clip e.g. Mestobu
- See current tracking buoys e.g. Mestobu (P3HB4HB)
- Flexible packaging e.g. PopsiCo - Danimer pre-commercial partnership (mcl-PHA)
- Durable E&E light switch e.g. ABS, Map, Kanika partnership (P3HB)

Jan Ravenstijn - 9 August 2019

*Selected slides from previous workshops



GO!PHA

Global Organization for PHA

The Global Organization for PHA (GO!PHA) is a member-driven, non-profit initiative to accelerate the development of the PHA-platform industry. Polyhydroxyalkanoate polymers (PHAs) provide a unique opportunity as a solution for reducing greenhouse gases and environmental plastics pollution, and establishing a circular economy, by offering a range of sustainable, high-quality and natural products and materials based on renewable feedstocks and offering diverse end-of-life options.

GO!PHA provides a platform for creating and sharing experiences and knowledge and to facilitate joint development initiatives.

Become a member or sponsor to start sharing, contributing and collaborating to accelerate the PHA-platform industry.

www.gopha.org