



# BioMates

## Deliverable D 7.3: 1<sup>st</sup> Dissemination Report

*Version 01*

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## Contents

1. Introducing BioMates .....	1
2. Summary .....	2
3. Conventional dissemination actions.....	3
4. Validation platform.....	5
5. Web-based dissemination and internal communication.....	5
6. Disclaimer .....	5
7. Literature .....	5

## 1. Introducing BioMates

### 1.1. The BioMates Project

The BioMates project aspires in combining innovative 2<sup>nd</sup> generation biomass conversion technologies for the cost-effective production of *bio*-based intermediates (BioMates) that can be further upgraded in existing oil refineries as renewable and reliable co-feedstocks. The resulting approach will allow minimisation of fossil energy requirements and therefore operating expense, minimization of capital expense as it will partially rely on underlying refinery conversion capacity, and increased bio-content of final transportation fuels.

The BioMates approach encompasses innovative non-food/non-feed biomass conversion technologies, including **ablative fast pyrolysis (AFP)** and single-stage **mild catalytic hydroprocessing (mild-HDT)** as main processes. Fast pyrolysis in-line-catalysis and fine-tuning of BioMates-properties are additional innovative steps that improve the conversion efficiency and cost of BioMates technology, as well as its quality, reliability and competitiveness. Incorporating **electrochemical H<sub>2</sub>-compression** and the state-of-the-art **renewable H<sub>2</sub>-production** technology as well as **optimal energy integration** completes the sustainable technical approach leading to improved sustainability and decreased fossil energy dependency. The overall BioMates-Concept is illustrated in Figure 1.

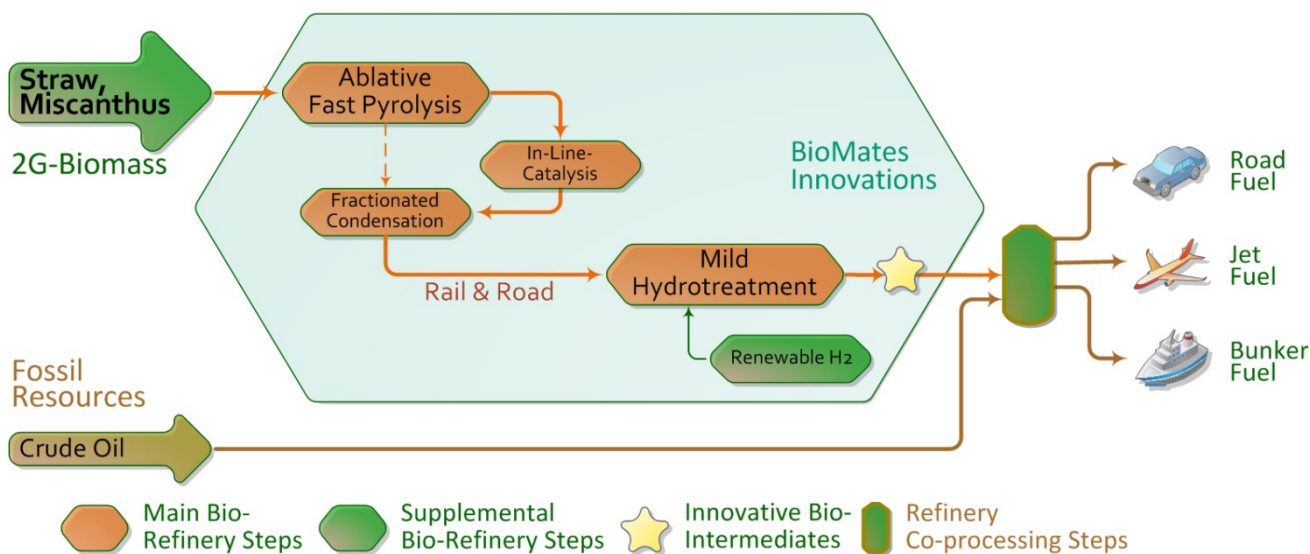


Figure 1: The BioMates-concept

The proposed technology aims to effectively convert residues and non-food/feed plants or commonly referred to as 2<sup>nd</sup> Generation (straw and short rotating coppice like miscanthus) biomass into high-quality bio-based intermediates (BioMates), of compatible characteristics with conventional refinery conversion units, allowing their direct and risk-free integration to any refinery towards the production of hybrid fuels.

### 1.2. European Commission support

The current framework strategy for a Resilient Energy European Union demands energy security and solidarity, a decarbonized economy and a fully-integrated and competitive pan-European energy market, intending to meet the ambitious 2020 and 2030 energy and climate targets /EC-2014a, EC-2014b/. Towards this goal, the European Commission is supporting the BioMates project for validating the proposed innovative technological pathway, in line with the objectives of the LCE-08-2016-2017 call /EC-2015/. This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 727463.



### 1.3. The BioMates team

The BioMates team comprises eight partners from industry, academia and research centres:

- Fraunhofer Institute for Environmental, Safety, and Energy Technology UMSICHT, Germany (Project Coordination) - [www.umsicht.fraunhofer.de](http://www.umsicht.fraunhofer.de)
- Centre for Research & Technology Hellas / CERTH - Chemical Process & Energy Resources Institute / CPERI, Greece - <http://www.cperi.certh.gr/>
- University of Chemistry and Technology Prague UCTP, Czech Republic - <http://www.vscht.cz>
- Imperial College London ICL, United Kingdom  
[www.imperial.ac.uk](http://www.imperial.ac.uk)
- Institut für Energie und Umweltforschung Heidelberg GmbH / ifeu, Germany - [www.ifeu.de](http://www.ifeu.de)
- Hydrogen Efficiency Technologies B.V. / HyET, Netherlands - [www.hyet.nl](http://www.hyet.nl)
- RANIDO, s.r.o., Czech Republic  
<http://www.ranido.cz/>
- BP Europa SE, Germany  
[www.bp.com/en/bp-europa-se.html](http://www.bp.com/en/bp-europa-se.html)

For additional information and contact details, please visit [www.biomates.eu](http://www.biomates.eu).

## 2. Summary

The dissemination activities concerning the project and its results are based on three pillars:

- Conventional dissemination actions,
- Validation platform and
- Webpage and internal communication

Conventional dissemination activities comprise mainly participation in scientific conferences, open days at partners with technical sites, and publication of results in peer-reviewed journals. During the first project year members of the consortium participated in 10 different conferences as poster presenter or lecturer and presented a total number of 16 contributions (either poster or lecture). Seven contributions to conference proceedings and one peer-reviewed article were published.

In the last year of the project duration, a comprehensive video will be produced to showcase the whole process chain, which is located at several physical sites from first conversion (ablative fast pyrolysis at Fraunhofer UMSICHT) over secondary upgrading (mild hydrotreatment at UCTP and CERTH) combined with efficient hydrogen compression and purification (at HyET and CERTH) until the final co-processing in a conventional petroleum refinery (demonstrated at CERTH and BP). Guided tours to these locations will be organized for potential customers and the interested public.

The final means of dissemination is a website which is dedicated to the project. Here the whole project is described and the participating research institutes and companies present themselves and their team members. All publicly available information on the project is gathered on the website for unrestricted access by the public. The website went online on December 23<sup>rd</sup>, 2016. Detailed description of the website is already given in deliverable report “D7.1: BioMates webpage”.



### 3. Conventional dissemination actions

The project has been presented at several international conferences during the first project year by means of posters as well as lectures. Table 1 lists all events, and Table 2 gives the respective titles and presenting authors of the contributions.

**Table 1:** Conferences visited to present the project

No.	Conference	Venue	Date	Type
1	2 <sup>nd</sup> ECATS Conference - Making aviation environmentally sustainable	Athens, Greece	November 7 <sup>th</sup> -9 <sup>th</sup> , 2016	Lecture
2	BIO-raffiniert IX	Oberhausen, Germany	February 13 <sup>th</sup> -14 <sup>th</sup> , 2017	Lecture
3	5 <sup>th</sup> International Conference on chemical Technology - ICCT	Mikulov, Czech Republic	April 10 <sup>th</sup> -12 <sup>th</sup> , 2017	4 Lectures, 1 Poster
4	13 <sup>th</sup> International Conference on Renewable Resources and Biorefineries – RRB-13	Wrocław, Poland	June 7 <sup>th</sup> -9 <sup>th</sup> , 2017	Lecture
5	25 <sup>th</sup> European Biomass Conference and Exhibition	Stockholm, Sweden	June 12 <sup>th</sup> -15 <sup>th</sup> , 2017	2 Posters
6	11 <sup>th</sup> International Colloquium Fuels	Esslingen, Germany	June 27 <sup>th</sup> -29 <sup>th</sup> , 2017	Lecture
7	Sustainability Assessment in biorefineries and biogas production	Sao Paulo, Brasil	July 3 <sup>rd</sup> , 2017	Lecture
8	Seminar Institute of Energy and Environment, Biomass Group, University of Sao Paulo	Sao Paulo, Brasil	July 5 <sup>th</sup> , 2017	Lecture
9	tcbiomass2017	Chicago, USA	September 19 <sup>th</sup> -21 <sup>st</sup> , 2017	2 Lectures
10	European Summer School on Multiscale Modeling in Chemical Reaction Engineering	Porto Carras, Greece	September 18 <sup>th</sup> -22 <sup>nd</sup> , 2017	Poster

Three of these conferences, namely the 5<sup>th</sup> International Conference on chemical Technology – ICCT, the 25<sup>th</sup> European Biomass Conference and Exhibition and the 11<sup>th</sup> International Colloquium Fuels, published conference proceedings, in which the consortium also contributed for every given presentation and poster for the respective conferences. All these publications can be accessed freely on the project website <http://biomates.eu/en/results/publications>.

In this first reporting period, one peer-reviewed publication as original research article was prepared and published under the leadership of UCTP:

Martin Staš, Josef Chudoba, Miloš Auersvald, David Kubička, Stefan Conrad, Tim Schulzke and Milan Pospíšil: Application of orbitrap mass spectrometry for analysis of model bio-oil compounds and fast pyrolysis bio-oils from different biomass sources; *Journal of Analytical and Applied Pyrolysis* 124 (2017), pp. 203-238, DOI: 10.1016/j.jaap.2017.02.002.

In addition to participating in conferences, Fraunhofer UMSICHT hosted two groups of visiting students from Rhine-Waal University of Applied Science, Campus Kamp-Lintfort, Germany, on December 5<sup>th</sup>, 2016, and University of Applied Sciences and Arts Hildesheim/Holzminde/Goettingen, Germany, on December 9<sup>th</sup>,



2016. During these visits, the project was presented and potential tasks for students were proposed. As a result, one student from Rhine-Waal University of Applied Science did his internship at Fraunhofer UMSICHT, performing work on staged condensation of primary pyrolysis vapours. He will continue this work in bachelor thesis, dealing with catalytic vapour phase upgrade of pyrolysis vapours.

**Table 2:** Titles and presenting authors of conference contributions

No.	Title	Presenting author	Author Affiliation	Conference No. (Table 1)
1	Sustainable HEFAs for Aviation (L)	Stella Bezergianni	CERTH	1
2	Biobasierte Intermediate zur Einspeisung in konventionelle Raffinerien – BioMates (L)	Volker Heil	Fraunhofer UMSICHT	2
3	Ablative fast pyrolysis – process for valorization of residual biomass (L)	Tim Schulzke	Fraunhofer UMSICHT	3
4	Overview of Applications of Pyrolysis Bio-Oils (L)	Martin Stas	UCTP	3
5	Reliable Bio-Based Refinery Intermediates – BioMates (L)	David Kubicka	UCTP	3
6	Study of Catalytic Hydrotreatment of Pyrolysis Bio-Oil (L)	Milos Auersvald	UCTP	3
7	The Theoretical Principles of Pyrolysis of Lignocellulosic Biomass (P)	Bogdan Shumeiko	UCTP	3
8	Reliable Bio-based Refinery Intermediates – BioMates (L)	Volker Heil	Fraunhofer UMSICHT	4
9	Reliable Bio-based Refinery Intermediates – BioMates (P)	Tim Schulzke	Fraunhofer UMSICHT	5
10	Producing Single Phase Fast Pyrolysis Condensates from Straw by Staged Condensation (P)	Stefan Conrad	Fraunhofer UMSICHT	5
11	Fuels from Reliable Bio-based Refinery Intermediates – BioMates (L)	Volker Heil	Fraunhofer UMSICHT	6
12	Biorefineries. Examples of EU projects (L)	Rocio Diaz-Chavez	ICL	7
13	Energy, climate change and sustainable development (L)	Rocio Diaz-Chavez	ICL	8
14	Temperature-dependent Vapor and Liquid Aerosol Separation – Comparison between Bubbling Fluidized Bed and Ablative Fast Pyrolysis Reactor Systems (L)	Stefan Conrad	Fraunhofer UMSICHT	9
15	Fuels from Reliable Bio-based Refinery Intermediates – BioMates (L)	Tim Schulzke	Fraunhofer UMSICHT	9
16	Hydroprocessing Modeling Toolkit for Process Design (P)	Kyriakos Panopoulos	CERTH	10

(L): Lecture, (P): Poster



## 4. Validation platform

The production of the video and the open days on the main technical premises are all anticipated for project year 4. Therefore, nothing is to be reported here.

## 5. Web-based dissemination and internal communication

The BioMates webpage [www.biomates.eu](http://www.biomates.eu) is the key dissemination tool of the project objectives, results and activities, addressed to specific target groups (potential commercial implementers, scientific community) as well as to the general public. The design of the BioMates webpage has the following goals:

- User-friendly environment for the core audience
- Improved visual design and content structuring (reduced clutter)
- Project identity leveraged to establish positive recall with the visitor
- Fast and easy navigation within the website
- Core technologies/products more visible to first-time users and easily available to repeat users

The website was built by project partner CERTH in the first 3 months of the project duration and went online on December 23<sup>rd</sup>, 2016. The overall structure of the website is fully described in the previous public report “D7.1: BioMates webpage”.

The main means of dissemination on the web-page is the tab “Results” with its 3 sub-categories “Publications”, “Press Releases” and “Deliverables”. All publications mentioned in chapter 3, either posters, lectures or contributions to conference proceedings or journal articles, are available from the “Publications” page. The page “Deliverables” provides access to all public deliverable reports as well as to the public summaries of confidential deliverable reports.

Furthermore, the webpage links to the internal communication platform between the project partners. This closed server for file exchange is operated by the partner Fraunhofer UMSICHT. After registration of a participant and approval from both his participant’s co-ordinator and the BioMates project co-ordinator, the system allows secured access for the exchange of confidential information within the consortium. The system allows individual access levels and keeps track of any version of the uploaded files and offers tools to ease joint editing of files, thus avoiding loss of work due to accidental overwriting.

## 6. Disclaimer

This Deliverable report reflects only the authors’ view; the European Commission and its responsible executive agency INEA are not responsible for any use that may be made of the information it contains.

## 7. Literature

EC-2014a European Commission, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - A policy framework for climate and energy in the period from 2020 to 2030, COM(2014) 15 final, Brussels, 22.01.2014, [http://www.europarl.europa.eu/meetdocs/2009\\_2014/documents/nest/dv/depa\\_20140212\\_06/depa\\_20140212\\_06en.pdf](http://www.europarl.europa.eu/meetdocs/2009_2014/documents/nest/dv/depa_20140212_06/depa_20140212_06en.pdf); <http://bit.ly/1LUcJKL>



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