SPECIAL

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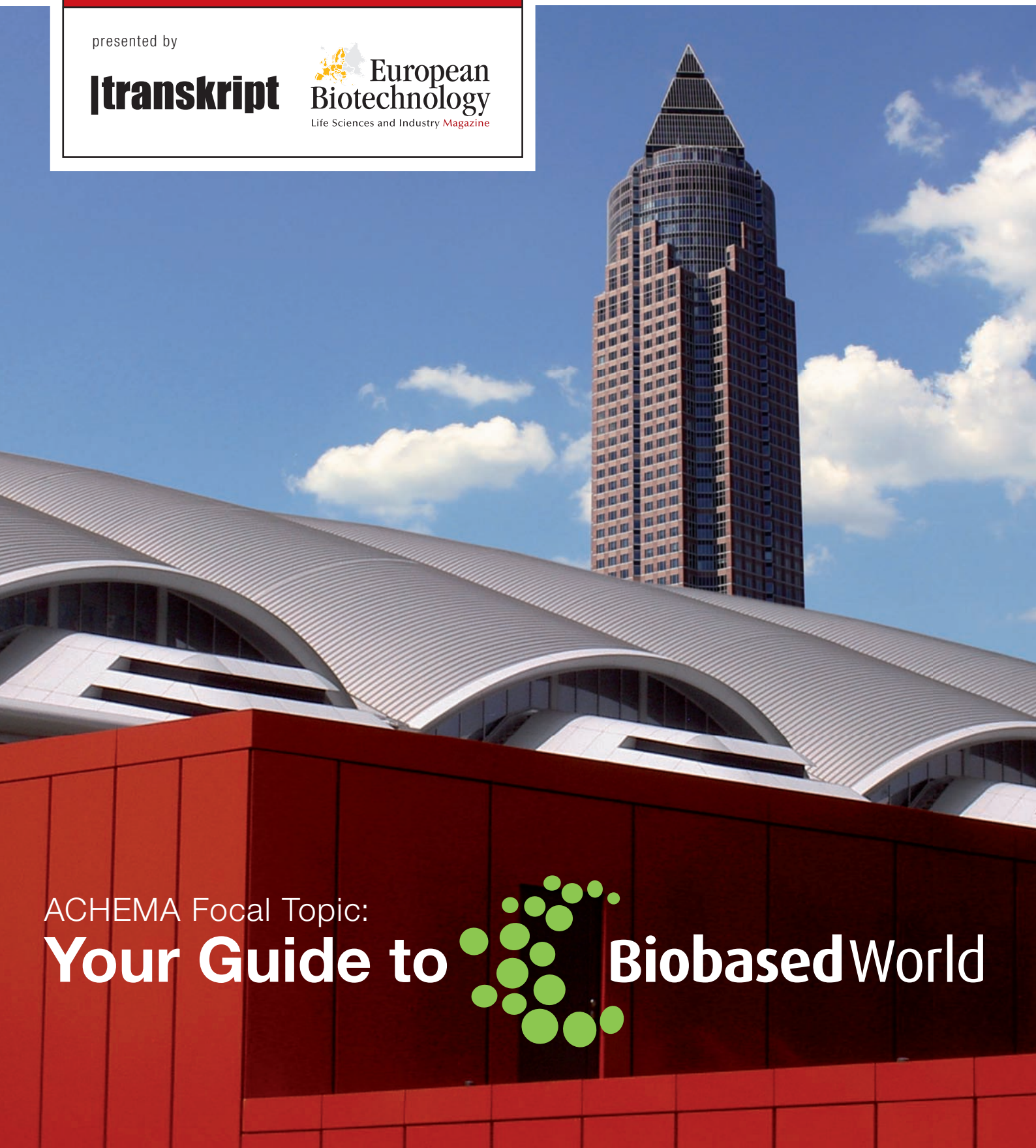
European Biotechnology
Life Sciences and Industry Magazine

ACHEMA 2015
in cooperation with DECHEMA



ACHEMA Focal Topic:

Your Guide to BiobasedWorld

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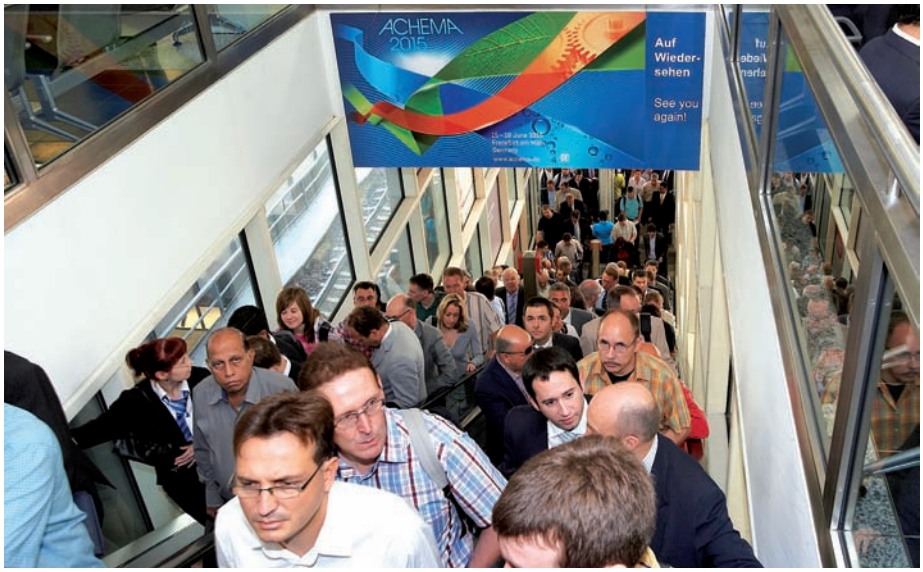


BiobasedWorld at ACHEMA
June 15 to 19, 2015 in Frankfurt a.M.

ACHEMA is once again putting on a huge exhibition with hundreds of lectures and thousands of exhibitors. When faced with the sheer size of the event, a little guidance will help you get the most out of it. This official Biotechnology and Life Sciences Guide to BiobasedWorld at ACHEMA 2015 aims to provide that guidance.

The focal topic BiobasedWorld at ACHEMA 2015 pays tribute to the momentum that bioeconomy has gained in the last few years and the important role it plays within the process industries. In this special we have summarised everything you need to know about bioeconomy at ACHEMA.

The meeting point of industrial biotechnology

BiobasedWorld at ACHEMA is the place where the bioeconomy becomes visible and tangible. Walk along the Via Mobile and run your fingers through wheat, corn and castor-oil plants. Have you ever wondered what miscanthus looks like? Live displays show you what goes into the biorefineries. The everyday products that are made from biobased materials are shown in the bioproduct exhibition at stand A39 in the foyer of hall 4.1 (see p. 10). Peek into the bioeconomy showcase in the galleria and get a glimpse of what the future might hold in store (see p. 7).

This guide has picked out a number of highlight topics that may be of special interest to our visitors. One such topic is biorefineries. From wood to Jerusalem artichokes: biorefineries are commanding an increasing share in the chemical industry (see p. 4). Algae may be inconspicious most of the time, but they are turning out to be the next big thing in bioprocessing (see p. 18).

Take a look at the congress programme with its many presentations about the technical, economic and political aspects of the bioeconomy. You will find the relevant programme excerpts in the highlight sections.

Take a walk with us

If you have a particular area of interest, the guide offers seven pre-arranged routes that will bring visitors interested in biotechnology and Life Sciences directly to exhibitors with strong ties to these sectors. The topics range from bioengineering and processes to laboratory equipment and packaging. Find out more on pages 12-17.

Strolling through the exhibition halls, look out for the green floor tiles. They mark the

stands of exhibitors who are active in bioeconomy and are ready to explain their expertise in the BiobasedWorld to you.

Welcome to ACHEMA and BiobasedWorld! Enjoy and immerse yourself at the meeting point of industrial biotechnology. ‹

Pictures: DECHEMA

Contents

Themed walks

Bioeconomy's powerhouses

Biorefineries In 2015, around 15 percent of all global chemical production employed biotech processes – a noticable jump up from the meagre four percent stake ten years ago. Reason enough to put the BiobasedWorld's spotlight on biorefineries.

Beta Renewables' biorefinery in Crescentino, Italy

Like their petroleum counterparts, the job of biorefineries is to produce chemical building blocks, which will be turned into a multitude of products by factories further along the value chain. Another similarity to oil refineries is that they look impressive from a distance, but you won't get really close to them unless you are part of the operations team. BiobasedWorld at ACHEMA gives you the opportunity to get a more detailed look at the biology and the mechanics of biorefineries.

Green leads the way through the exhibition

Green floor tiles within the exhibition halls will help you to easily identify the booths of the exhibitors who have a finger in the bioeconomy pie in some way or other. As the topic covers such a broad spectrum, the part that a company plays can be manifold. Aspects of current research are displayed in the bioeconomy showcase in the galleria; come and stop by to get a glimpse into the future.

At BiobasedWorld, you will find providers of turnkey ethanol plants as well as specialists for biogas analytics or simulation software. What special features do filters for biofuels need and which press is best used for extracting oilseeds? Are there special membranes for the processing of fermentation residues or decanters to concentrate algal biomass? The exhibitors of BiobasedWorld will answer these questions and many more.

Bridging theoretical concepts and practical application

The focal topic is also reflected in about 90 presentations of the extensive congress programme. Economic and political factors influencing the bioeconomy are taken into account as well as technical details. Tuesday morning starts off with a panel discussion (in German) about whether bioeconomy is caught in the shale-gas trap. In the noon session biorefinery concepts from all over Europe will be presented. Learn how little data is available about the industrial use of biomass and what it takes to make different industries cooperate in the name of bioeconomy.

Watch out for the green floor tiles

If you are about to go from lab scale to industrial application with your process, pilot plants are available to bridge the gap. The afternoon session is dedicated to feedstock and building blocks. Biorefineries can be based on substrates as ubiquitous as CO_2 or as exotic as Jerusalem artichokes or bamboo to make things more interesting. Ethanol is the most prominent product, but organic acids are gaining attention too and the carbon source can even be converted directly to biopolymers, if you just use some smart bacteria.

Wood: the most abundant raw material

If you come to Frankfurt on Wednesday, the speakers of the session "Latest insight on

Picture: Beta Renewables (top), DECHEMA (bottom)

Biorefinery platforms: Biorefinery concepts

Tuesday, 16 June 2015 in Harmonie 3, CMF

12:30 › **Cascaded valorisation of food waste using bioconversions as core processes**
L. Garcia-Gonzalez, S. Bijttebier, S. Voorspoels, M. Uyttebroek, K. Elst, W. Dejonghe, Y. Satyawali, D. Pant, K. Vanbroekhoven, H. De Wever, VITO, Mol/B

13:00 › **From lab to commercial – process scale-up at Fraunhofer CBP**
T. Elter, G. Unkelbach, Fraunhofer CBP, Leuna/D; Th. Hirth, Fraunhofer IGB, Stuttgart/D

13:30 › **The bioeconomy as a regional, cross-sector approach – the concept, objective and structure behind the BioEconomy Cluster in Central Germany**
R. Busch, BioEconomy Clustermanagement GmbH, Halle/D

14:00 › **Study of the biobased industry in Europe**
L. Nattrass, E4tech, London/UK

14:30 › **Bio Base Europe Pilot Plant: an instrument for start-ups and SMEs to bridge the gap between laboratory research and industrial production**
H. Waegeman, Bio Base Europe Pilot Plant, Gent/B

Biorefinery platforms: Feedstock and building blocks

Tuesday, 16 June 2015 in Harmonie 3, CMF

15:00 › **Bioethanol production from Jerusalem Artichoke (*Helianthus tuberosus L.*)**
S. Gross-Selbeck, Vogelbusch Biocommodities GmbH, Vienna/A

15:30 › **Valorisation of bamboo towards the production of levulinic acid and sugars**
L. Appels, N. Sweygers, R. Dewil, KU Leuven Sint-Katelijne-Waver/B

16:00 › **Valorisation of exhaust CO_2 to chemicals and fuels using bioconversions as core processes**
L. Garcia-Gonzalez, S. Bjaracharya, S. Mozumder, S. Srikanth, M. Kunda, D. Pant, H. De Wever, VITO, Mol/B

16:30 › **New biobased building blocks contributing to added functionality in sustainability-improved plastics**
S. De Wildeman, Maastricht University, Geleen/NL

Thursday, 18 June 2015 in Illusion 1, CMF

10:30 › **Synthesis of platform chemicals from renewable resources by applying micro reaction technology**
T. Türcke, S. Löbbecke, Fraunhofer ICT, Pfi nztal/D

11:00 › **Accelerated phototrophic process development: light meets microtiter plates**
H. Morschett, Forschungszentrum Jülich GmbH/D; D. Ritter, C. Müller, T. Welters, m2p-labs GmbH, Baesweiler/D; W. Wiechert, M. Oldiges, Forschungszentrum Jülich GmbH/D

11:30 › **Bioconversion of renewable feedstocks and (agri/food) residues into lactic acid**
J. Venus, Leibniz-Institute for Agricultural Engineering Potsdam-Bornim (ATB)/D

12:00 › **Sustainable recycling of poly lactate based waste**
P. Ballmann, M. Müller, S. Dröge, Test and Research Institute Pirmasens/D

12:30 › **Fluid salt cracking – a new process for the production of aromatic compounds**
J. Forstner, Fraunhofer-Institut für Chemische Technologie, Pfinztal/D

Two questions for ...

Dario Giordano, CEO Beta Renewables

ACHEMA Special › What is your prediction for the future of biobased production and biorefineries?

Giordano › *Now that cellulosic ethanol technologies are proven at scale, I expect a period of 2-4 years in which the first movers will develop industrial projects and strengthen their value proposition. 2018–2020 should be the timeframe for an inflection point in the uptake of the technology. We expect in that timeframe a further development of large-scale biorefining of non-food lignocellulosic feedstock into biofuels and bio-based petrochemical.*

ACHEMA Special › What topic of conversation are you looking forward to most at ACHEMA 2015?

Giordano › *I am looking forward to discussing how we can facilitate project development and financing in an area where technology is now becoming available at industrial scale.*

lignocellulosic biorefineries" will take you on a guided trip to the hotspots of bioethanol production. It will cover biorefineries in rural Germany and Italy as well as Iowa and Pennsylvania in the United States, where you will see prominent examples for facilities that are in actual operation from pilot to industrial scale.

Thursday morning is all about building blocks and shows the development of platform chemicals from microscale and microtiter plate to the large scale production of lactic acid. And of course, sustainable recycling of biobased plastics cannot be forgotten.

Thursday afternoon is dedicated to the processing of biomass, especially woody biomass and shows the latest technologies available.

Pluck up the courage, raise your voice and ask lots of questions, the speakers are looking forward to lively discussions. ‹

Latest insights on lignocellulosic biorefineries

Wednesday, 17 June 2015 in Harmonie 3, CMF

15:00 › The investigation of biomass sugar as the feedstock for PlantBottle packaging
M. Schultheis, The Coca-Cola Company, Atlanta, GA/USA; H. Ren, The Coca-Cola Company, Shanghai/CHN; K. Stadler, The Coca-Cola Company, Berlin/D

15:30 › Environmental and economic performance of process alternatives for multi-feedstock cellulosic sugar production
J. Villegas, University of Geneva/CH; K. Harding, University of the Witwatersrand, Johannesburg/ZA; M. Patel, University of Geneva/CH

16:00 › Cellulosic ethanol: commercialisation and application in biofuels and biochemicals
M. Rarbach, P. Corvo, C. Heikaus, Clariant Produkte GmbH, Munich/D

16:30 › Overcoming the challenges to large-scale deployment
D. Giordano, Beta Renewables S.p.A., Tortona/I

17:00 › Renewable chemical platforms and biobased materials
D. Cross, F. Moesler, Renmatix, Inc., King of Prussia, PA/USA

17:30 › Integrated corn ethanol and corn stover ethanol production: a step towards a biorefinery?
H. Bosch, Royal DSM NV, Heerlen/NL

Biorefinery platforms: Processing of biomass

Thursday, 18 June 2015 in Illusion 1, CMF

15:00 › Processing woody biomass – pilot plant and simulation prove feasibility and profitableness of LX-Process
F. Streffer, maxbiogas GmbH, Marienwerder/D; K. Brandt, INOSIM Consulting GmbH, Dortmund/D

15:30 › Lignocellulosic biofuels
N. Schwaiger, H. Pucher, R. Feiner, TU Graz/A; L. Ellmaier, P. Pucher, BDI-BioEnergy-International AG, Grambach/Graz/A; M. Siebenhofer, TU Graz/A

16:00 › Ionic liquids for biomass dissolution
B. Iliev, T.J.S. Schubert, IOLITEC Ionic Liquids Technologies GmbH, Heilbronn/D

16:30 › Carbo-V biomass gasification – status after application of sound engineering practices
S. Petersen, Linde Engineering Dresden GmbH/D

Pictures: Beta Renewables, Marlie Swart via flickr.com (top left), DECHEMA (top right, bottom left), Novozymes (bottom right)

Biobased Economy Information, explanation and future scenarios

Biobased economy is a current buzzword. It addresses the development of a future economic system that exclusively uses renewable raw materials from agricultural and forestry resources to produce all necessary chemical products we need today and in the future. What are the consequences of such a change? How will the bioeconomy affect our everyday lives? If we start using biobased plastic products, what will happen to people in the other countries that are dependent on the renewable raw material?

To address all necessary knowledge needed to understand the complex field of biobased economy at ACHEMA 2015, DECHEMA has asked three players in the field, the Fachagentur Nachwachsende Rohstoffe (FNR), representing the Federal Ministry for Food and Agriculture (BMEL), the Projektträger Jülich (PTJ) representing the Federal Ministry of Education and Research (BMBF) and BIOPRO Baden-Württemberg, a state owned economic development organisation, to collocate an information booth about biobased economy.

Picture: BIOPRO Baden-Württemberg GmbH

Named “showcase on biobased economy”, several value added chains (vacs) for biobased products are shown and integrated into a value added network for biobased economy representing an overview on many applications for a biobased world. In five value added chains, product scenarios are displayed ranging from the corresponding renewable resource material, the conversion products followed by intermediate products, the resulting material and the final product. The presented vacs range from heat resistant biobased polyester resin to lignin based carbon fibres. A bio-methane-based car mobility concept is shown alongside biobased plastics development for 3D-printing.

As a special highlight, results of an ideas competition performed by the BMBF for future products in biobased economy are presented. As an additional topic, frame conditions of the bioeconomy are explained in an interactive presentation showing current simulation and modelling tools displaying the impact and consequences of the switch from fossil to renewable resources on various levels.

The current progress of the biorefinery-approach in Leuna is presented with the bioeconomy top-cluster activities. The initiators provide information on current and future developments in biobased economy, research programmes and public support opportunities. ‹

Bioeconomy goldrush will be a long time coming

Interview with Eugen Weinberg The resource specialist talks about why the financial markets are hesitant to jump on the biobased bandwagon.

ACHEMA Special › "Sustainability" is a topic very much en vogue at the moment. How much interest is there among the financial markets for companies with a focus on sustainability?

Weinberg › *While the media has been celebrating the topic over the last few years and still pays a lot of attention to it, the topic of sustainability seems to leave the financial markets cold at the moment. Although it depends on the specific sectors and areas, the financial market participants do not eagerly agree on paying a "premium" for sustainability. This may change in the future but the financial markets first and foremost look for profitability, whereas sustainability often comes at some cost.*

ACHEMA Special › The falling oil prices have put substantial pressure on the biofuel industry. How significant is the influence of the price of competing resources like conventional oil for the bioeconomy?

Weinberg › *Perception is often a reality! If market participants come to the conclusion that bioproducts offer some benefit compared to the traditional petrol-based products, they might be ready to pay higher prices for them. This may as well be the case if the legislative initiatives stimulate the demand for bioproducts via tax relief or imply fixed market shares or absolute selling volumes. Ceteris paribus in normal market conditions, the bioproducts must be competitively priced. In order to increase the market share for bioproducts, even a more aggressive pricing for them must be necessary in order to prevail the customers' prejudice and customs.*

Eugen Weinberg, Head of Commodity Research at Commerzbank, Frankfurt a.M. (Germany), was born in Russia in 1977 and studied business mathematics in Moscow. Weinberg later became fund manager and commodity analyst at Stuttgart-based BW-Bank. He set up the Commodity Research at DZ Bank in Frankfurt a.M. before joining Commerzbank AG in March 2007. He and his team are responsible for the analysis and strategy in the commodity sector.

ACHEMA Special › Oil reserves are limited, while pressure to reach climate goals is increaasing. Do you think it is only a matter of time that naturally occuring oil will be obsolete?

Weinberg › *I think that the Peak Oil (the theory that says that we are about to reach the maximum oil production level, from which the production will be continuously sinking) is more media hype and myth. The "reach of oil reserves" is just a function of price, not of its physical availability. The fear of "running out of gas" has been present on the market ever since the first successful oil drilling more than 150 years ago. Right now with the shale and other unconventional oil deposits known and available, the world is not going to "run out" of oil during the next century. However, the end of the Oil Era may indeed be nearing with ever better alternative engine technologies and replacement of fossil fuels by the biofuels and higher demand for hybrid, electric or fuel cell cars. We should not forget that the Stone Age did not end because we ran out of stones.*

ACHEMA Special › Champions of the bioeconomy promote a biologisation of the industry, with the aim to eventually introduce biological raw materials to all industrial sectors. From a financial standpoint, is this vision realistic?

Weinberg › *From the current point of view it's difficult to see a very strong biologisation of the industry. There are many barriers in its way: the acceptance, the technological breakthrough, the availability of materials, often higher costs etc. In my opinion, rather than thinking about the substitution of the traditional raw materials base and the replacement of the existing applications, the bioeconomy should focus more on identifying the niche sectors, products, processes and technologies best served by the bioeconomy and its means.* ‹

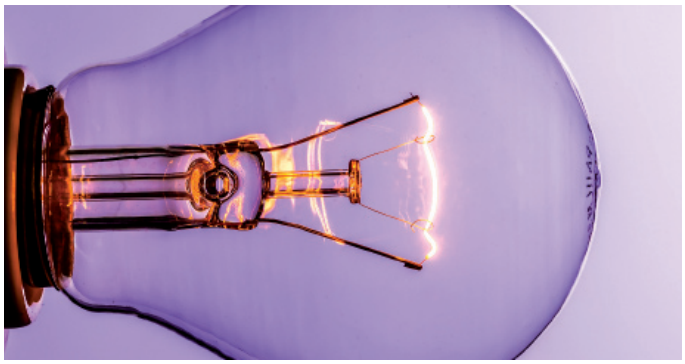
Abb.: Commerzbank AG

Bioeconomy in the Shale-Gas Trap?

Tuesday, 16 June 2015 in Room Europa, Hall 4.0

10:30 › **Panel discussion (in German)**
G.K. Kalkoffen, ExxonMobil Central Europe Holding GmbH, Hamburg/D
W. Büchele, Linde AG, Munich/D
E. Weinberg, Commerzbank AG, Frankfurt/D
H. Zinke, BRAIN AG, Zwingenberg/D
Moderator: K. Wagemann, DECHEMA e.V.,Frankfurt/D

Electrobiotech Sparking hope in biotechnology



There is actually something valuable in what we flush down the toilet: energy. It can be harvested by bacteria which extract electricity from the wastewater. And the opposite principle is just as exciting – bacteria can feed on electricity to enhance their production of organic compounds. Electrobiotechnology is still largely in the R&D stage. Scientists working on the research project ValueFromUrine, for example, have set out to reclaim almost all of the phosphorus and nitrogen components contained within urine. And they are trying to kill two birds with one stone: the researchers are attempting to use microbes to simultaneously capture energy.

More than a year ago, DECHEMA created a working group that focuses on electrobiotechnology. At ACHEMA 2015, interdisciplinary experts will present the fledgling field of electrobiotechnology and discuss the latest advances and the challenges of these kinds of bioproduction systems.

Tuesday, 16 June 2015 in Illusion 1, CMF

12:30 › **Towards hybrid microbial – enzymatic biofuel cells with extended lifetime**
S. Sané, J. Eipper, S. Kerzenmacher, University of Freiburg/D

13:00 › **Putting the "spark" in Bioreactors: from sketch to bench**
L.F.M. Rosa, C. Gimkiewicz, C. Stang, T.R. dos Santos, S. Hunger, A. Zehnsdorf, F. Harnisch, Helmholtz-Zentrum für Umweltforschung, Leipzig/D

13:30 › **Electro-enzymatic system to overcome enzyme instabilities in H_2O_2- dependent biocatalysis**
A. Horst, T. Krieg, J. Schrader, D. Holtmann, DECHEMA-Forschungsinstitut, Frankfurt/D

14:00 › **The electrode as interface between electrochemistry and microbiology: recent developments and prospects**
I. Schmidt, A. Baudler, S. Riedl, U. Schröder, TU Braunschweig/D

14:30 › **Molecular engineering of microbial electrocatalysts for microbial electrosynthesis applications**
M. Rosenbaum, S. Schmitz, K. Kaufmann, T. Kirchner, S. Nies, B. Molitor, A. Henrich, RWTH Aachen University/D

Bringing bio to the table

Exhibition Sometimes you have to look twice to see the qualities of some biobased products. Take a closer look at the hands-on bioeconomy exhibition which shows how bioproducts have already found their way into our everyday lives.

There are products that have always been biobased. The favourite drink of football fans, for example. 6,000 years ago, the Sumerians brewed the very first beer from leftover bread. But bio is no longer limited to food. Recent years have cranked up an economy aiming to use renewable, biologic resources for a wide range of products. And biomass – from microbes, animals, plants, soil and even waste – may even lead to new processes and products with added values. A selection of these everyday products will be presented by BIOCOM AG at the bioeconomy exhibition.

Wall plugs from castor beans

Handymen with a passion for sustainability can now take action: with "green" wall plugs. The biodegradable wall plug is a pilot project.

Selling like hotcakes: green wall plugs

The little but indispensable helper does its regular job securing screws in walls, but it is made from polyamide produced from over 50 percent castor oil. Production is currently still more expensive in comparison to conventional mounting devices. But according to the manufacturer, they are nevertheless being snapped up off the shelves in hardware stores. As a sustainable product, it sows the seeds for further biobased materials.

A woody mountain bike

Wood is ubiquitous, wood is cheap and wood is versatile. However, no one would think of wood as particularly light. But a German company has found a way to make the material lightweight – it can even compete with aluminium and carbon. The manufacturing process involves the splicing of thin veneer layers in a spiral pattern. The resulting tube is not only light but also highly resilient. The hightech biomaterial has many potential uses – such as a designer bicycle that is not only environmentally friendly, it's sustainable too.

A bike made from wood, in this case ash

Making milk fashionable

Milk is part of a healthy diet, especially for kids. But milk also has the stuff to conquer the hearts of fashionistas. Its protein casein is now being used as a raw material in the textile industry.

Bio-based chic: dress made from milk

A company from Germany has developed a method by which the casein can be formed into fibres. During the manufacturing process, whey is dried, mixed with liquid and pressed through a fine sieve. The biopolymer is naturally antibacterial and can be easily dyed. The best part: only nonconsumable milk, for example the filtrate left over from cheese production, is used. And according to the producer, the manufacturing process uses significantly less water than processing cotton.

Roughcast made from microbes

Microorganisms in sewage plants are indispensable helpers in biological sewage purification. Certain bacteria can even be used at home like little cleaning elves – directly where waste is produced.

A tidy business: TP for clear drains

To avoid blockage in pipes and septic tanks and to prevent unpleasant odours, an Italian manufacturer has developed bioactive toilet paper. The spores of several naturally occurring bacterial species sprayed on the inner sides of adjacent layers of paper have a special effect when they come into contact with water. The microbes multiply and immediately begin to degrade biological matter and reduce nasty odours in the toilet pipe.

Tableware from bamboo

Bamboo grows fast and does not need a whole lot of maintenance or plant protec-

Pictures: BIOCOM AG

tion. It is also sturdy enough to be made into everyday products. A manufacturer of tableware uses bamboo-based material for the production of cups, plates and bowls and even jugs. The dishes contain 70 percent chopped bamboo fibres, which are ground up and dyed. The binding materials used for the dishes are naturally occuring resins. The colourful dishes are even dishwasher-safe.

Pictures: BIOCOM AG

Bambooware: Dishes from the sturdy evergreen

Bioproducts used as raw natural materials are easily overlooked, but they too deserve their place in the spotlight. Such as artificial spider silk made by genetically modified bacteria, which is used as an anti-inflammatory coating in breast implants or for the production of ultra-lightweight, extremely strong thread. Or take fragrances and flavours for example, courtesy of microorganisms: fungi, yeasts and bacteria can produce natural scents for perfumes and food, for example, vanilla.

Come and take a look

These are just a selection of the many products on display at the bioeconomy exhibition at ACHEMA 2015. Whether in the kitchen, bathroom or garage – biobased products have grown to be part and parcel of our everyday lives. You can find the exhibition in the foyer of Hall 4.1. ‹

Two questions for ...

Sandra Wirsching
Division Manager
BIOCOM AG

ACHEMA Special › Which bioproducts will have the greatest impact?

Wirsching › *Bioplastic is already a reality in many industries – from car components to beverage bottles. And I am not the only one to predict a huge increase in market volume for bioplastics in the near future.*

ACHEMA Special › Do you have a favourite among the biobased products?

Wirsching › *I really like the armchair made from leather tanned with an extract derived from olive leaves. It is also a godsend after a long day at the conference!*

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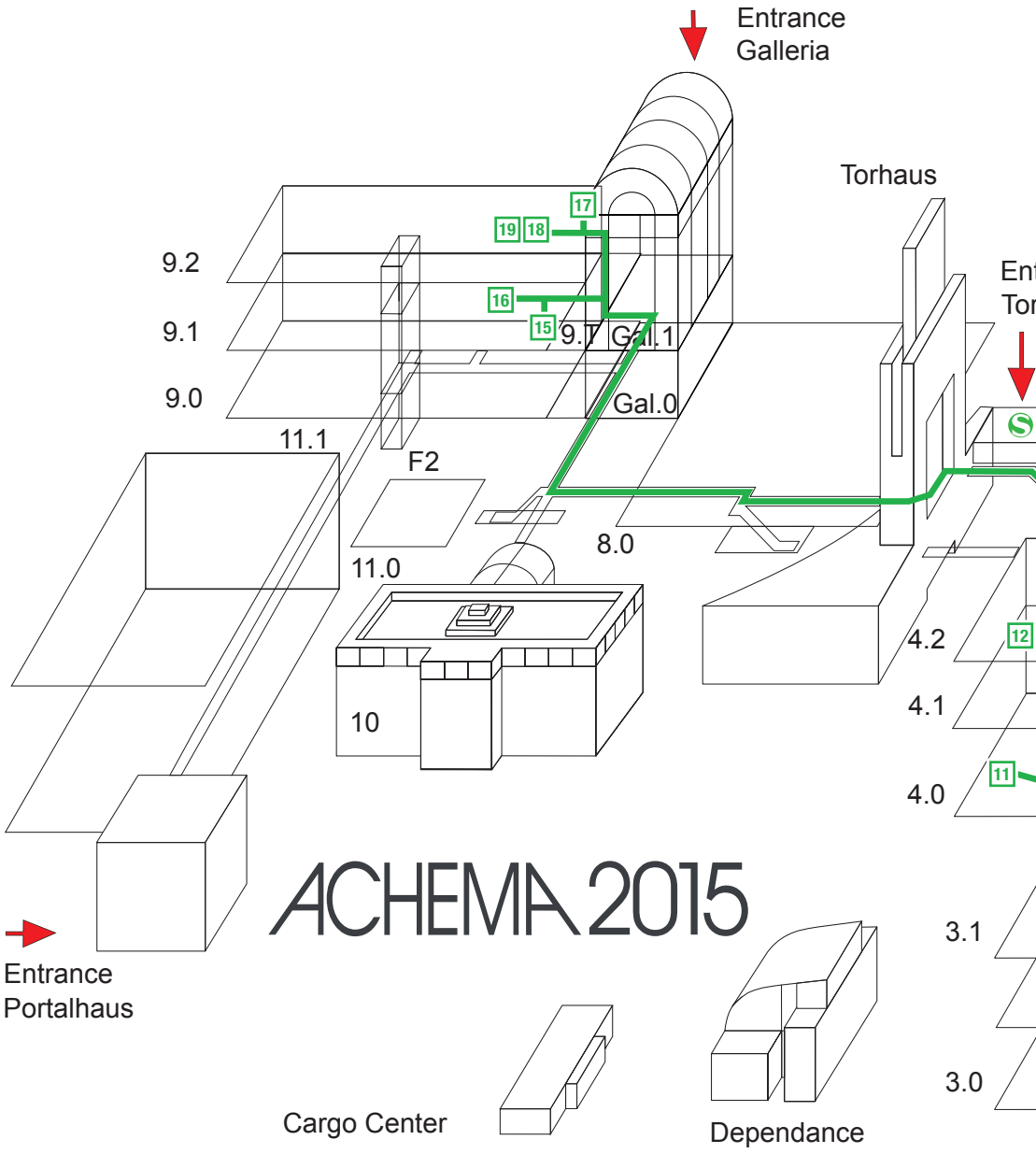

Walk 1
Bioengineering and Process Technology

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Stand: B43, Hall 4.0 >>> 9

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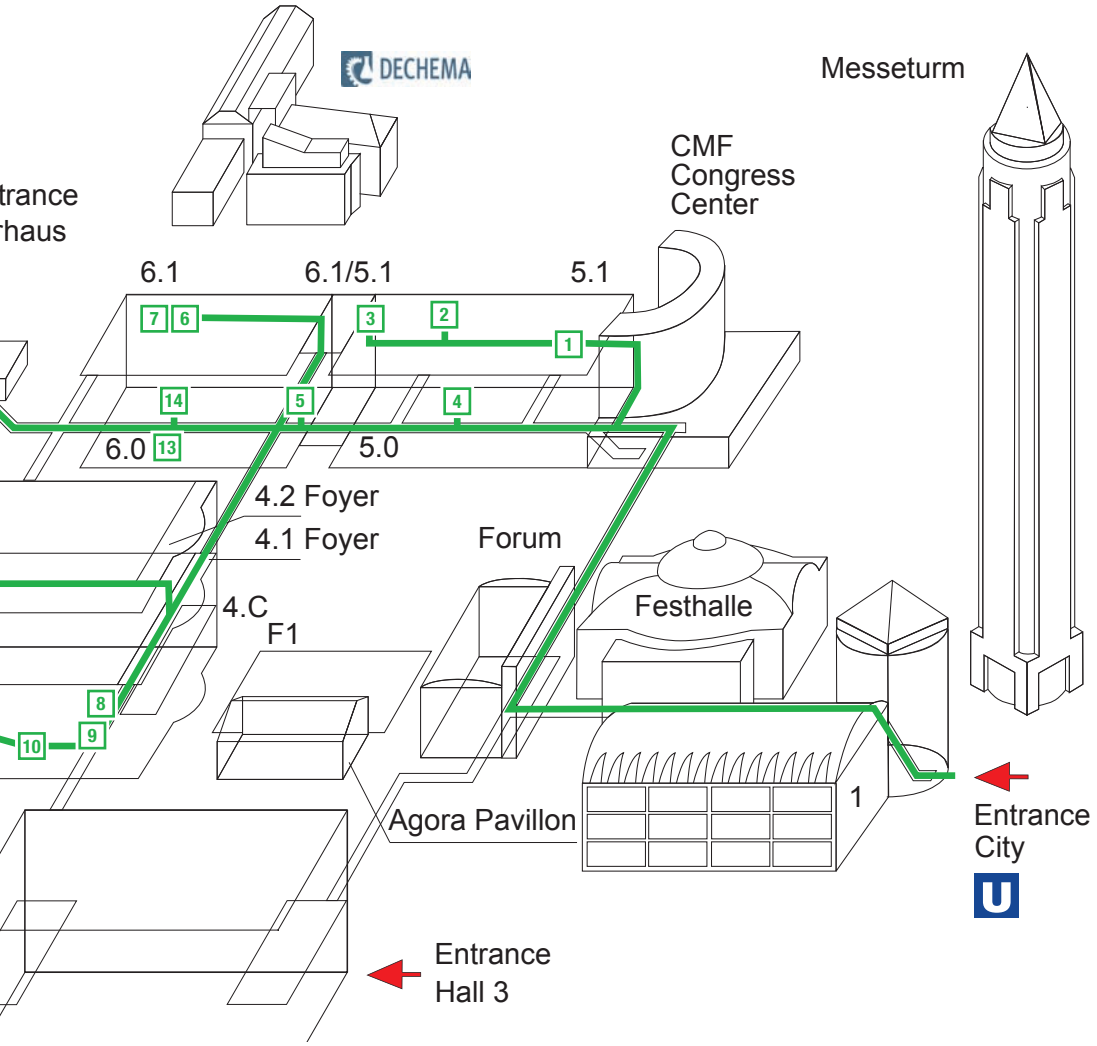
Pierre Guerin has been for 30 years a global supplier, leader in design and manufacture of stainless steel bioprocessing systems for fermentation and cell culture processes.

www.pierreguerin.fr

Finesse Solutions AG

Stand: B80, Hall 4.1 >>> 12

Finesse Solutions provides intelligent bioprocess management solutions. Ourhardware and software automation tools allows for unmatched bioprocessing. Our mission is to supply smart, intuitive & easy to use solutions in both single-use and traditional formats. **www.finesse.com**



3M Purification

Stand: C73, Hall 6.0 >>> 13

3M Purification is a global market leader in developing, manufacturing and marketing an innovative, efficient and economic range of purification products for a variety of industrial markets (pharma, biopharm, chemicals, automotive, metal, energy, water). **www.3m.com**

Pall Life Sciences

Stand: C74, Hall 6.0 >>> 14

Pall provides products and services to customers discovering, developing and producing drugs, vaccines and classic pharmaceuticals in research, clinical diagnostics, genomics and proteomics markets.

www.pall.com

M+W Group GmbH

Stand: B3, Hall 9.1 >>> 15

M+W Group is a leading global company in the field of high-tech engineering and construction. Experienced project teams are on the spot all around the world delivering tailor-made solutions.

www.mwgroup.net

Bilfinger LTM

Stand: D28, Hall 9.2 >>> 19

Bilfinger LTM engineers, fabricates and assembles piping, systems and equipment for petrochemical, chemical, energy, nuclear, food, pharmaceuticals and cosmetics industries. The range of services covers the entire plant life cycle.

www.bilfinger.com

Bilfinger Industrietechnik Salzburg

Stand: D28, Hall 9.2 >>> 18

Bilfinger Industrietechnik Salzburg engineers, fabricates and assembles piping, systems and equipment for the biotechnology and pharmaceuticals industry, the semiconductor and energy sectors and general industry.

www.bilfinger.com

VOGELBUSCH Biocommodities GmbH

Stand: F3, Hall 9.2 >>> 17

Our longstanding experience in industrial biotechnology integrates well in today's biobased industry landscape. Share our unique expertise in the implementation of microbial production techniques and downstream processes.

www.vogelbusch-biocommodities.com

Silica Verfahrens-technik GmbH

Stand: C25, Hall 9.1 >>> 16

Founded more than 85 years ago, Silica Verfahrenstechnik GmbH is your expert for manufacturing of adsorption plants. We supply tailor-made process plants for purification and drying of air, gas and liquids.

www.silica.de

Themed Walks around ACHEMA 2015

BLOCK a.s.

Stand: E9, Forum 1

BLOCK® offers comprehensive services in design preparation, the manufacture and construction of complete industrial plants with sophisticated technologies and high quality of environment (clean rooms).

www.blockcrs.com

GE Healthcare

Stand: H22, Hall 4.1 2

GE Healthcare's Life Science business provides tools and technologies as well as solutions and expertise, which enable the biopharmaceutical industry to develop and manufacture biotherapeutic medicines and vaccines cost-effectively.

www.gelifesciences.com

BRAND GMBH + CO KG

Stand: G35, Hall 4.1 3

BRAND is a German manufacturer of Liquid Handling Instruments (dispensers, burettes, manual and electronic pipettes), volumetric glass- and plasticware and premium Life Science consumables (PCR, storage, immunology, cell culture).

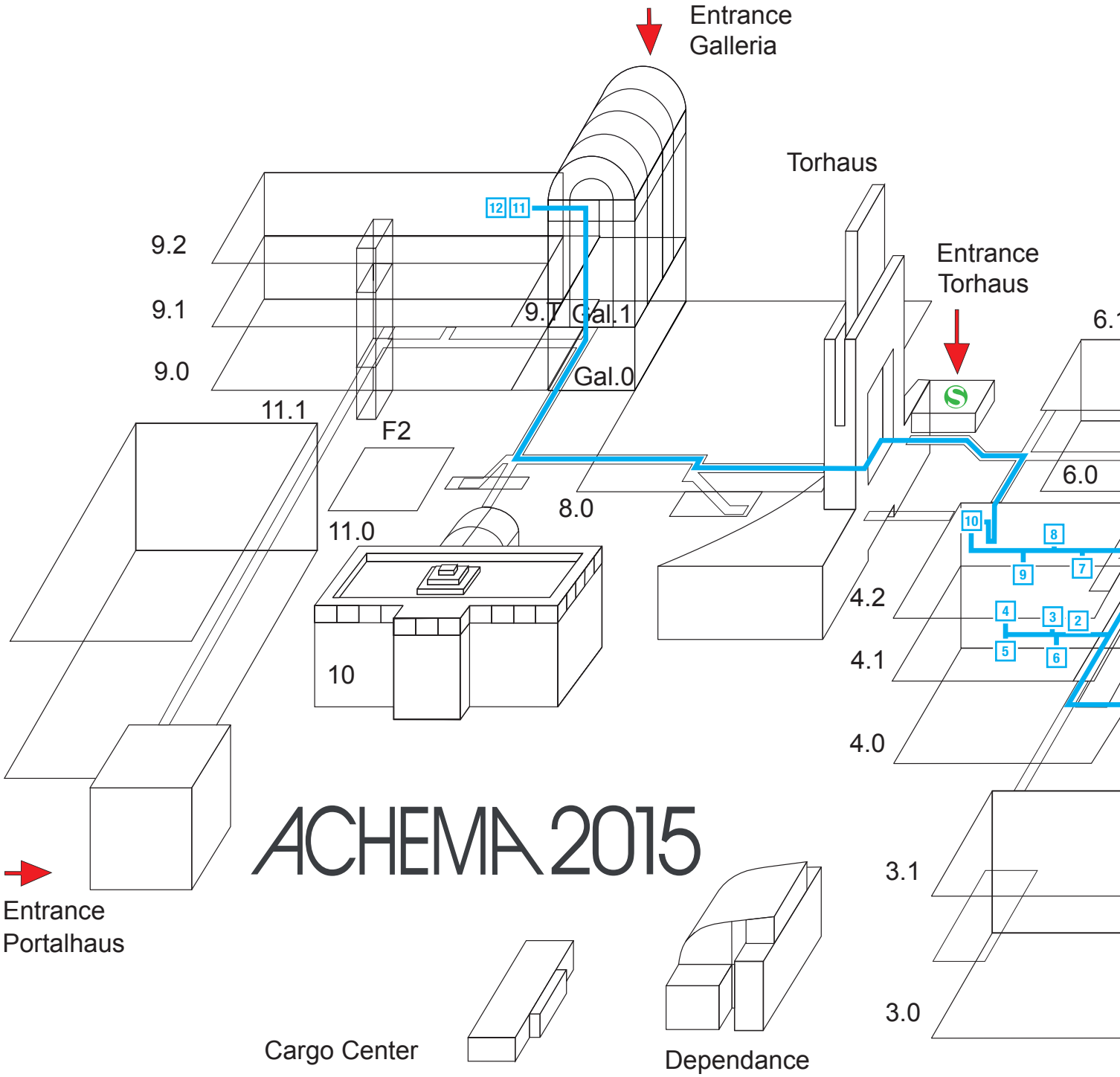
www.brand.de

Kimble Chase

Stand: E54, Hall 4.1 4

Kimble Chase LLC is the leading manufacturer of the most comprehensive range of laboratory and scientific glassware, specialising in vials, test tubes, pipettes, media bottles, flasks and beakers.

www.kimble-chase.com



VACUUBRAND GMBH + CO KG

Stand: K49, Hall 4.1 5

VACUUBRAND offers chemical resistant vacuum pumps and pumping units, ATEX vacuum pumps, local area vacuum networks (VACUU·LAN®) and state-of-the-art vacuum gauges and controllers for use in laboratory and industry.

www.vacuubrand.com

Wyatt Technology Europe GmbH

Stand: N29, Hall 4.1 6

Wyatt Technology is the leading manufacturer and provider of instruments for the characterization of macromolecules. Wyatt offers complete solutions for the analysis of proteins, polymers and particles with respect to molar mass, size and shape determination. www.wyatt.eu

Werksitz GmbH W. Milewski

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We are looking after your health and increasing perfomance. We have developed an extensive range of swivel chairs und workplace floor mats for industry, laboratories, trade and sheltered workshops.

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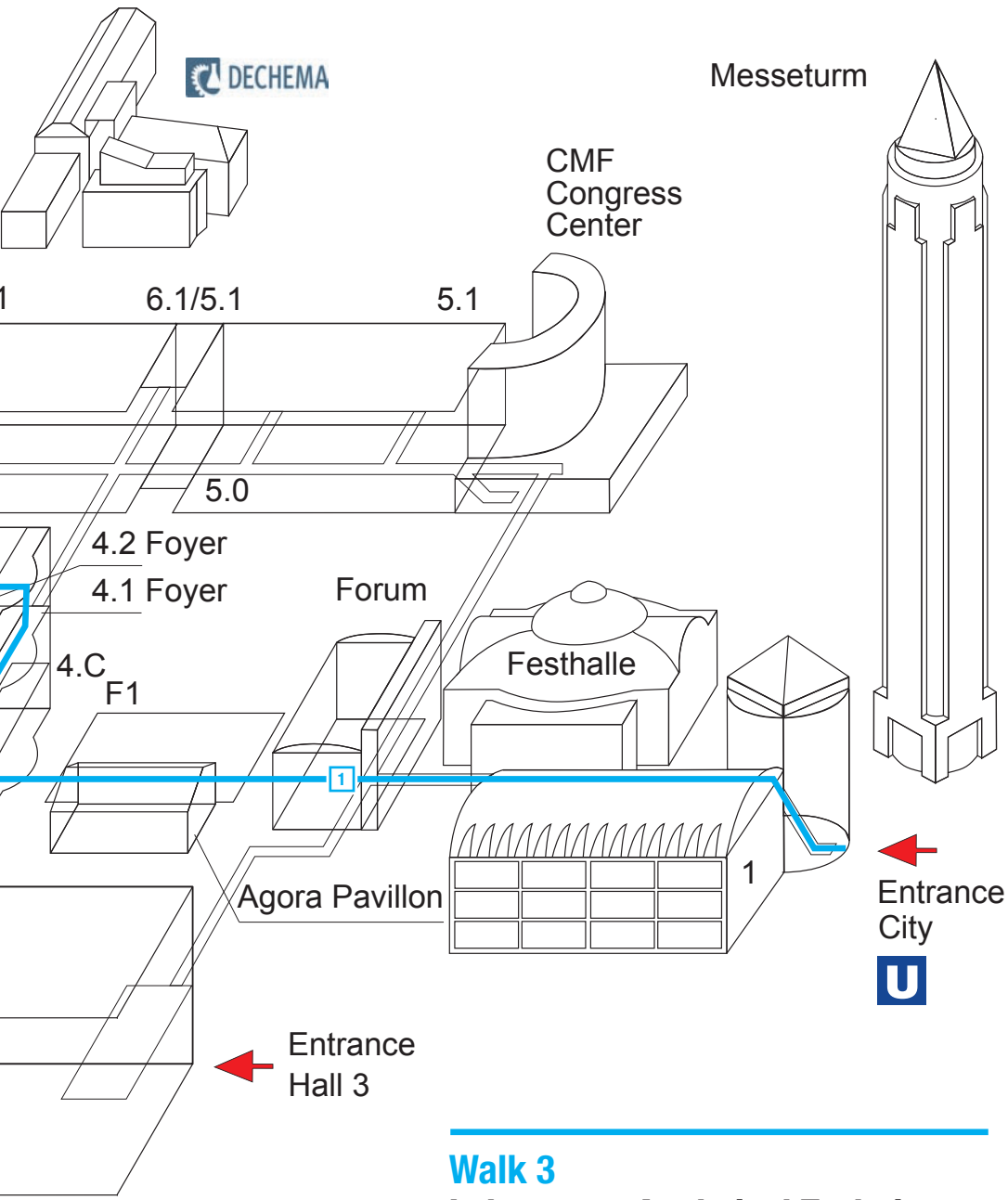
SENTEK Ltd.

Stand: G42, Hall 4.2 8

A full range of Electrochemical Sensors will be on display, for example the P29 Penetration Food Probe. Sentek's manufacturing programme is flexible enough to supply probes to suit virtually every meter on the market.

www.sentek.co.uk



Walk 3

Laboratory, Analytical Techniques, and Biotechnological Equipment

XUTEMP TEMPTECH Co., Ltd

Stand: K55, Hall 4.2 9

Leading manufacturer for constant temperature instrument for laboratories and process. Baths, chillers, circulators, stability chambers, growth chambers, ovens and incubators … Certificated for CE mark. Meet requirements for DIN 12876 and DIN 12880. www.xutemp.com

infoteam Software AG

Stand: A79, Hall 4.2 10

infoteam Software AG is an established service provider with extensive experience in software development for Laboratory Automation. infoteam is DIN EN ISO 13485 certified in the field of medical software engineering.

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Bilfinger LTM

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Bilfinger LTM engineers, fabricates and assembles piping, systems and equipment for petrochemical, chemical, energy, nuclear, food, pharmaceuticals and cosmetics industries. The range of services covers the entire plant life cycle. www.bilfinger.com

Bilfinger Industrietechnik Salzburg

Stand: D28, Hall 9.2 12

Bilfinger Industrietechnik Salzburg engineers, fabricates and assembles piping, systems and equipment for the biotechnology and pharmaceuticals industry, the semiconductor and energy sectors and general industry.

www.bilfinger.com

Tuttnauer Europe BV

Stand: D68, Hall 6.1 1

Leading autoclave manufacturer & provider of infection control solutions for Life Science industry with over 350 000 installations worldwide for Pharma Production & Research, Laboratories & Hospitals.

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Yanpai Filtration Technology

Stand: C21, Hall 5.1 1

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www.yanpai.com

DECHEMA-Forschungsinstitut

Stand: E40, Hall 9.2 1

Biotech research at DFI focuses on engineering microbes and designing bioprocesses for sustainable production of chemicals. Special expertise in metabolic engineering, in situ product removal, methanol based fermentations, bioelectrochemistry and more.

www.dechema-dfi.de

Finesse Solutions

Stand: B80, Hall 4.1 1

Finesse Solutions provides intelligent bioprocess management solutions. Our mission is to supply smart, intuitive & easy to use solutions in both single-use and traditional formats.

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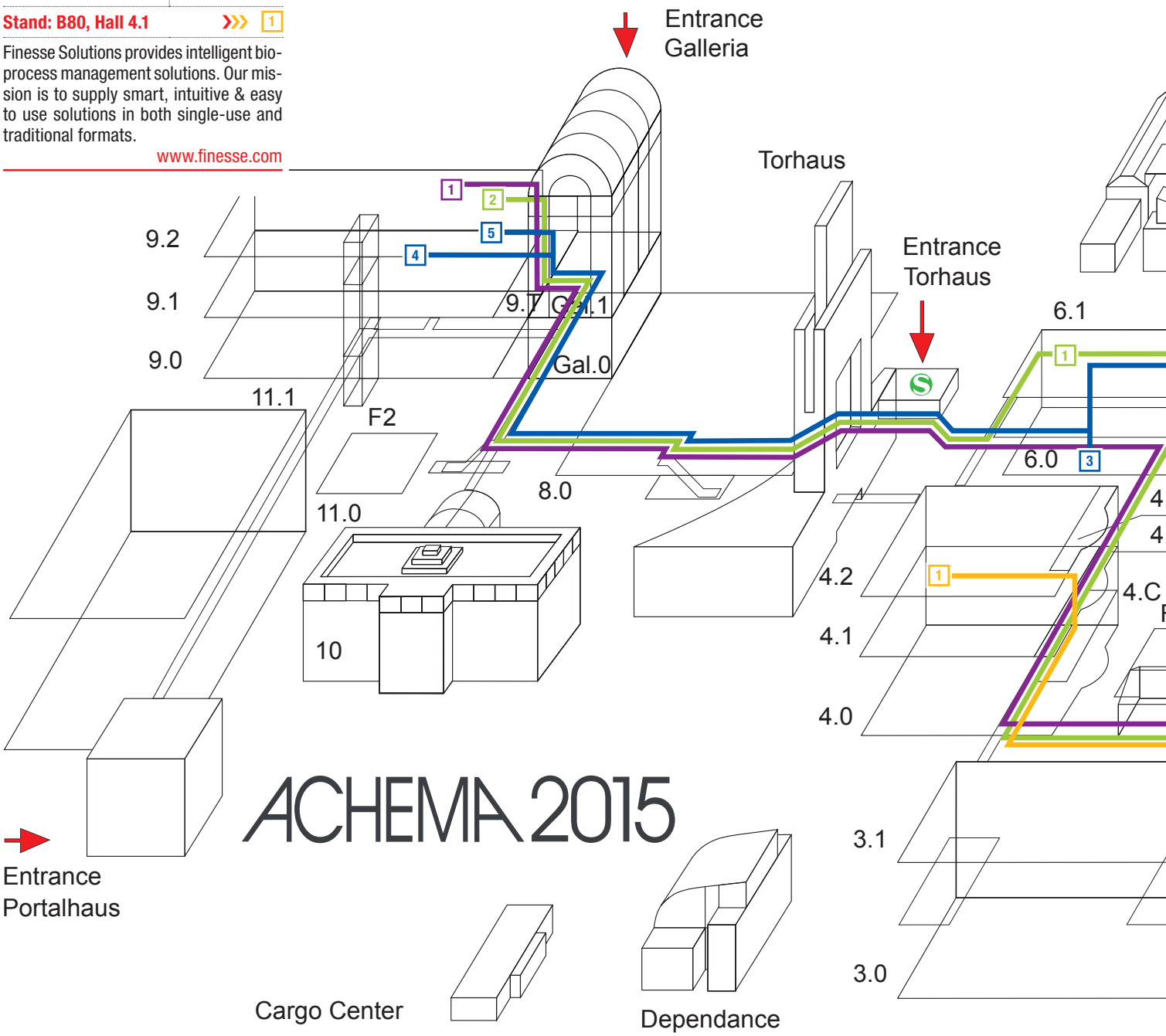

haspa GmbH

Stand: B32, Hall 5.1 1

haspa manufactures a complete programme of flexible shafts and machines for various applications and customised solutions, e.g. for tube cleaning, surface treatments as well as adjusting of valves and flaps, for dosages and for power transmission. **www.haspa-gmbh.de**

Zwahlen & Mayr SA

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ZM produce stainless steel WELDED TUBES for applications such as Heat Exchangers for Food processing, Air conditioning, Chemical & Petrochemistry and Power plants and REDRAWN TUBES for Pharmaceutical, Pneumatic and measurement instruments. **www.zwahlen.ch**

MT FILTER Co., Ltd

Stand: A36, Hall 6.0 3

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VACUUBRAND GMBH + Co. KG

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Oriental NICCO Projects Private Ltd.

Stand: C17, Hall 9.2 5

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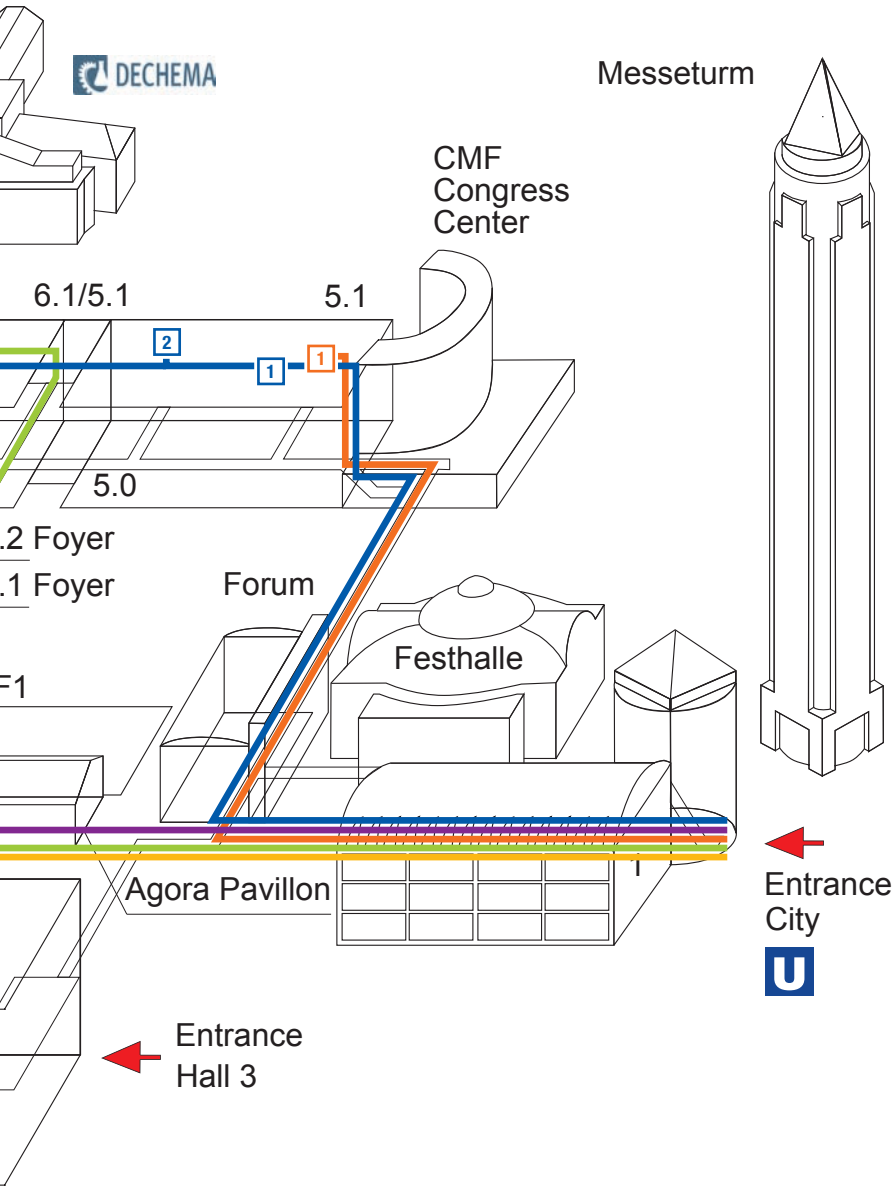


Walk 2
Instrumentation, Control and Automation Techniques

Walk 4
Pharmaceutical, Packaging and Storage Techniques

Walk 5
Industrial and Labour Safety, Biobased Materials, Technology and Testing

Walk 6
Research and Innovation

Walk 7
Pumps, Compressors, Valves and Fittings, Thermal Processes

Green hope from the deep

Algal technology Algae are everywhere – but have so far spent their lives dwelling in the shadows. Until now. Today, the unassuming organisms are set to make a big splash in bioeconomy. Will algae prove to be the panacea in biofuel production and biorefineries?

Chlorella, Dunaliella, Porphyra, Spirulina … they sound like they could be Ariel the mermaid's sisters. And indeed, they are aquatic organisms: algae and cyanobacteria can be found in nearly any aquatic system on our planet, from icy glaciers and hot springs to the glass flower vase on your windowsill. A key function of these simple, plant-like organisms is to capture light and perform photosynthesis to convert CO_2 into sugars and oxygen.

The potential uses of the slimy green pest

Seaweeds, algae's bigger cousins, have been a staple in the Asian diet for centuries. It wasn't until the sushi boom that Europe recognised that algae could be more than the obnoxious green slime in your garden pond. Fast forward twenty years and algae are the great white hope of bioeconomy.

With bioprocesses growing increasingly popular and biorefineries mushrooming, biomass could become a limited resource in the foreseeable future. Algae have significantly higher biomass productivity than plants. However, transferring the theoretical potential into an industrial process is no mean feat.

Algal products made affordable by industrial symbioses

Open ponds can be built at relatively low cost but are prone to contamination. Photobioreactors, on the other hand, allow for full process control. However, the large financial investment needed, requires high-value products to ensure a profit.

A large part of the algae product market is made up of dietary supplements consisting of Spirulina and Chlorella biomass, which is simply dried after harvesting. One step further is the extraction of highly valuable components, such as the bright red astaxanthin and polyunsaturated fatty acids, which are also used as dietary supplements.

Prototype plant of the All-gas project

The conversion of algal biomass to biofuels is more complex but nonetheless promising with some algal species comprising up to 50 percent oil. For such a low-value commodity, economic production is the top priority and it seems that synergies are the key. The world's largest petroleum refinery in Jamnagar, India, hosts a demonstration plant with 400 photobioreactors. The algae there are fed with off-gas from the refining process and the reactors are designed to yield 545 litres of fuel out of every tonne of CO_2.

Getting the most out of waste water

Kalundborg municipality in Denmark also relies on the use of industrial residues as resources for sustainable microalgae production. At Kalundborg, not only CO_2 but also nitrogen and

Pictures:: fotolia #21434396 - © Pawel Burgiel (top), www.all-gas.eu (bottom)

Microalgae Biorefinery

Wednesday, 17 June 2015 in Harmonie 3, CMF

10:30 › **Wastewater bioremediation using microalgae biomass for the production of biofuels and biochemicals**
C. González-Fernández, IMDEA ENERGY, Madrid/E; M. Ballesteros, CIEMAT, Madrid/E

11:00 › **Sustainable bioenergy production by combining microalgae culture and anaerobic treatment of domestic wastewater**
I. de Godos Crespo, Z. Arbib, FCC aqualia, Chiclana de la Frontera/E; B. Llamas Moya, F. Rogalla, FCC aqualia, Madrid/E; E. Lara Corona, FCC aqualia, Sevilla/E;

11:30 › **Facilitating microalgae production and biorefineries through the introduction of Industrial Symbiosis concepts**
P. Møller, Kalundborg Municipality/DK

12:00 › **A microalgae biorefinery for complete valorisation of wet biomass for commodity products**
F. F.García-Cuadra, J.M. Fernández-Sevilla, F.G. Acién, E. Molina-Grima, University of Almería/E

12:30 › **Microalgal biomass harvesting through drainage**
P. Lopez, University Complutense of Madrid/E;C. Reparez, Everis Energia y Medioambiente, Madrid/E; C. Negro, University Complutense of Madrid/E

phosphorus are recycled from waste water streams that promote algal growth.

The “All-gas” project in Spain follows the same principle. Co-financed by the EU Commission within the FP7 programme, the project is also based on the large-scale use of waste water as a culture medium for microalgae, and adds a biogas plant into the process chain. The latest developments in microalgae technology will be part of the BioBased World congress programme at ACHEMA 2015. There are two microalgae sessions planned on Wednesday 17 and Friday 19 June, room Harmonie 3 at the CMF Congress Center. ›

Spotlight on Algae at ACHEMA

Wednesday, 17 June 2015 in Harmonie 2, CMF

16:00 › **Industrial Water Management: Cultivation of microalgae in wastewater and conversion into a soil additive by hydrothermal carbonisation**
B. Hupfauf, M. Koch, A. Dumfort, M. Rupprich, Management Center Innsbruck/A; A. Bockreis, Universität Innsbruck/A

Microalgae Biorefinery

Friday, 19 June 2015 in Harmonie 3, CMF

10:30 › **Microalgal biorefinery: process design and economic assessment**
G. Olivieri, M.H.M. Eppink, Wageningen University/NL; M.J. Barbosa, Wageningen University and Research Centre/NL; R.H. Wijffels, Wageningen University/NL

11:00 › **Microalgal biomass use in aquiculture – an overview**
A. Otero, Santiago de Compostela University/E

11:30 › **PUFAChain – a value chain following the biorefinery concept from algal biomass to lipid-based products**
T. Friedl, A. Kryvenda, M. Lorenz, Universität Göttingen/D; S. Durm, EurA Consult AG, Ellwangen/D

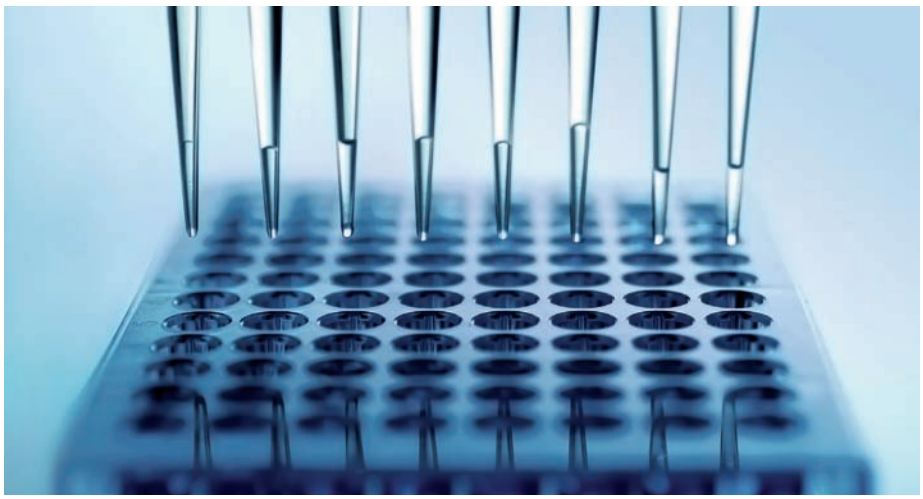
12:00 › **High added value microalgae substances by GRAS processes: scale-up of supercritical CO_2 extraction intensified with high power ultrasounds**
E. Casas Sanz, M. García Suárez, J. Montañés Barahona, A. Tornero Martos, J. García Reverter, AINIA Centro Tecnológico, Paterna (Valencia)/E

12:30 › **Production and characterisation of biogenic, microstructured calcite particles – an unconventional product from microalgae**
I. Hariskos, C. Posten, M. Vučak, Karlsruhe Institute of Technology (KIT)/D

Roadmap Automation 2025+

Industrial Biotechnology Automation is of crucial concern in the field of white biotechnology. After all, new processes might be developed on a lab bench, but they must eventually work on a much larger scale. German trade association ZVEI's automation specialists have detailed the future developments of automation in a roadmap.

› Dr Siegfried Behrendt, Dr Markus Winzenick



The German Electrical and Electronic Manufacturers' Association, ZVEI e.V., prepares integrated technology roadmaps for early identification of future markets and technology needs for the automation industry on a regular basis, and has received very positive feedback. These roadmaps analyse trends, perspectives and challenges, derive technology needs and draw conclusions for companies active in the automation industry.

The new roadmap, which was produced by the Institute for Future Studies and Technology Assessment, IZT, examines "Industrial Biotechnology". It focuses on five future markets: biocatalysis in industrial production, bioplastics, biorefineries, Blue Biotechnology and microreaction technology. In cooperation with experts from the field of industrial biotechnology and the automation industry, needs for automation were identified and recommendations for actions drawn.

All examined fields are very dynamic. Measuring and control technology plays a key role in all future markets studied. Automation needs arise where process yields can be increased, process safety improved and product quality optimised. Requirements range from measuring new parameters to miniaturisation of sensors, multiparameter sensors and inexpensive realtime analytics. Interfaces are often missing.

Upscaling from lab to industry processes is a very common need in regards to process technology. One of the goals is the development of robust, continuous processes. The highest need for technological development was identified for bio refineries.

Bringing automation and process specialists together

A key interest is the development of integrated concepts for high quality utilisation of all components of renewable resources. In the long term, new production concepts become visible, which are relevant to the automation industry. Those require model based simulation tools, which in turn rely on model databases.

A better understanding of biological systems will enable the development of new control systems, allowing for the use of measuring and control technologies on a molecular level within biological units. For plant development, it is vital to keep the whole process in mind. In this regard, the roadmap notes that automation and process specialists need to cooperate more effectively as early as during the process development.

Integrated Roadmap "Industrial Biotechnology"

Wednesday, 17 June 2015 in Dimension, Hall 4.2

10:30 › **Joint talk (in German)**
Presentation of the integrated roadmap "Industrial Biotechnology"
M. Winzenick, Zentralverband Elektrotechnik- und Elektronikindustrie (ZVEI) e.V., Frankfurt/D; S. Behrendt, Institut für Zukunftsstudien und Technologiebewertung gGmbH (IZT), Berlin/D

Company statements by:
T. Böhland, Evonik Industries AG, Hanau/D
K. Köhler, Endress + Hauser Messtechnik GmbH & Co.KG, Weil am Rhein/D
U. Vogel, Samson AG, Frankfurt/D
M. Fernandez, Siemens AG

This roadmap can be ordered at the ZVEI:
Dr Markus Winzenick
CEO Fachverband AUTOMATION
Phone: +49 (0)69-6302-426
winzenick@zvei.org
For further information contact:
Dr Siegfried Behrendt
IZT Institute of Future Studies and Technology Assessment, Berlin
Phone: +49 (0)30-803088-10
s.behrendt@izt.de

ACHEMA Start-up Award
The founders of tomorrow

Together with the Business Angels FrankfurtRheinMain and the High Tech-Gründerfonds, DECHEMA have established the ACHEMA Start-up Award for start-ups and future founders in the fields of energy, measurement and analytics as well as industrial biotechnology. The award ceremony is part of the ACHEMA opening session on Monday 15 June 2015, where the winners of the three categories will be announced. Three participants from each category have been selected for the final round. They will present their technologies and concepts at the ACHEMA Start-up Award stand in Hall 9.2. The finalists in the category "Industrial Biotechnology" are:

- 4GENE develops and produces natural, biotechnologically engineered, activatable Aroma-Glycosides. The products are marketed as FLAVOR-ON-DEMAND to customers in the flavour and fragrance industry worldwide.
- Bionicure's technology aims at releasing pharmaceutical substances from a depot in the body, triggered by specific molecules that are supplied orally.
- Glyconic develops marketable ingredients for cosmetics and food based on natural polyphenol glycosides.

Pictures: pdesign/Fotolia, Franz Pfluegl/Fotolia

Exhibitors BiobasedWorld

Visit the following companies planning exhibitions within the focal topic BiobasedWorld.

- AKW Apparate + Verfahren (6.0, B86)
- Bilfinger (9.2, D28)
- Chemspeed Technologies (4.2, J50)
- CINC (5.1, D90)
- Flowserve (8.0, B63)
- Filtrox (5.1, B16)
- Hach Lange (4.1, F35)
- Hiller (5.0, A44)
- Pamas (4.1, A58)
- Rigaku (4.2, G80)
- Siemens (11.0, C3)

FRINGS
Heinrich Frings GmbH & Co. KG
Hall 4.0 Stand B43

Information about FRINGS

In the sector of sterile process technology, FRINGS offers aggregates, systems and entire bio process plants for food biotechnology, for industrial biotechnology and for the pharmaceutical industry.

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BOOK

European Biotechnology Guide Vol. 5

Championing scientific diversitiy in Europe! The brandnew European Biotechnology Science & Industry Guide 2015 provides a wealth of information on companies and organisations offering products and services in the life sciences. In addition to the detailed company and institution portraits, the 5th edition of the directory contains a data breakdown of BIOCOM's report "Comparative Analysis of European Biotech Stock Markets". Discover the success stories and the latest developments in the biotech industry.

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BIOCOM

BiobasedWorld See you again in 2017

Wait a minute – the next ACHEMA is scheduled for 2018, isn't it?

Yes, but as bioeconomy is a fast moving business, we would like to invite you to take part in BiobasedWorld, 15–16 February, 2017 in Cologne, Germany. If your business is industrial biotechnology, algae, biorefineries, biopolymers, bioenergy, biobased lubricants, surfactants, fuels or materials, BiobasedWorld is the trade show for you. Experience the biobased value chain from the door of the biorefinery to your own doorstep.

Discuss ideas, see the processes, look at the equipment and touch the products in the exhibition space. Listen to presentations about the latest trends in the conference programme and network with the crème de la crème of the biobased economy. BiobasedWorld is the global meeting point for the bioeconomy community.

BiobasedWorld
15-16 February 2017, Cologne

The new ACHEMA App Stay on the ball while on the move

Even when you are on the move, with the mobile exhibition guide to ACHEMA 2015 you will always have the salient facts at your fingertips: all of the ACHEMA exhibitors from A-Z with hall and stand numbers, interactive hall plans for orientation on the exhibition grounds, short company profiles of exhibitors with business fields and products as well as the daily updated congress programme including all lectures and speakers. Simple search functions cover all product categories, exhibition groups and halls.

But its not just your interactive guide, it also offers interactive features: create lists of your favourites and even your personal ACHEMA schedule. And it is your access point to ACHEMA Partnering: get in touch directly with other participants and share interesting exhibition stands and lectures via social media (Twitter).

The ACHEMA app will be available at official app stores from mid-May 2015 free of charge (Supported devices: iPhone iOS 7 and above).

Download on the App Store

This is an ACHEMA special jointly presented by the magazines European Biotechnology and |transkript, published by BIOCOM AG in cooperation with DECHEMA Ausstellungs-GmbH and DECHEMA Gesellschaft für Chemische Technik und Biotechnologie e.V. BIOCOM AG, Luetzowstr. 33–36, 10785 Berlin, Tel.: +49-30-2649210, Fax: +49-30-264921-11, Email: info@eurobiotechnews.eu; www.eurobiotechnews.eu, www.transkript.de. Publisher: Andreas Mietzsch; Editorial Team: Uta Mommert, Julie Colthorpe; Advertising: Oliver Schnell, +49-30-2649-2145, Christian Böhm, +49-30-2649-2149, Andreas Macht, +49-30-2649-2154; Distribution: Marcus Laschke, +49-30-2649-2148; Printed at: H. Heenemann GmbH & Co. KG; Graphic Design: Michaela Reblin.

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The European Biotechnology Network is dedicated to facilitating co-operation between professionals in biotechnology and the life sciences all over Europe. This non-profit organisation brings research groups, universities, SMEs, large companies and indeed all actors in biotechnology together to build and deliver partnerships.

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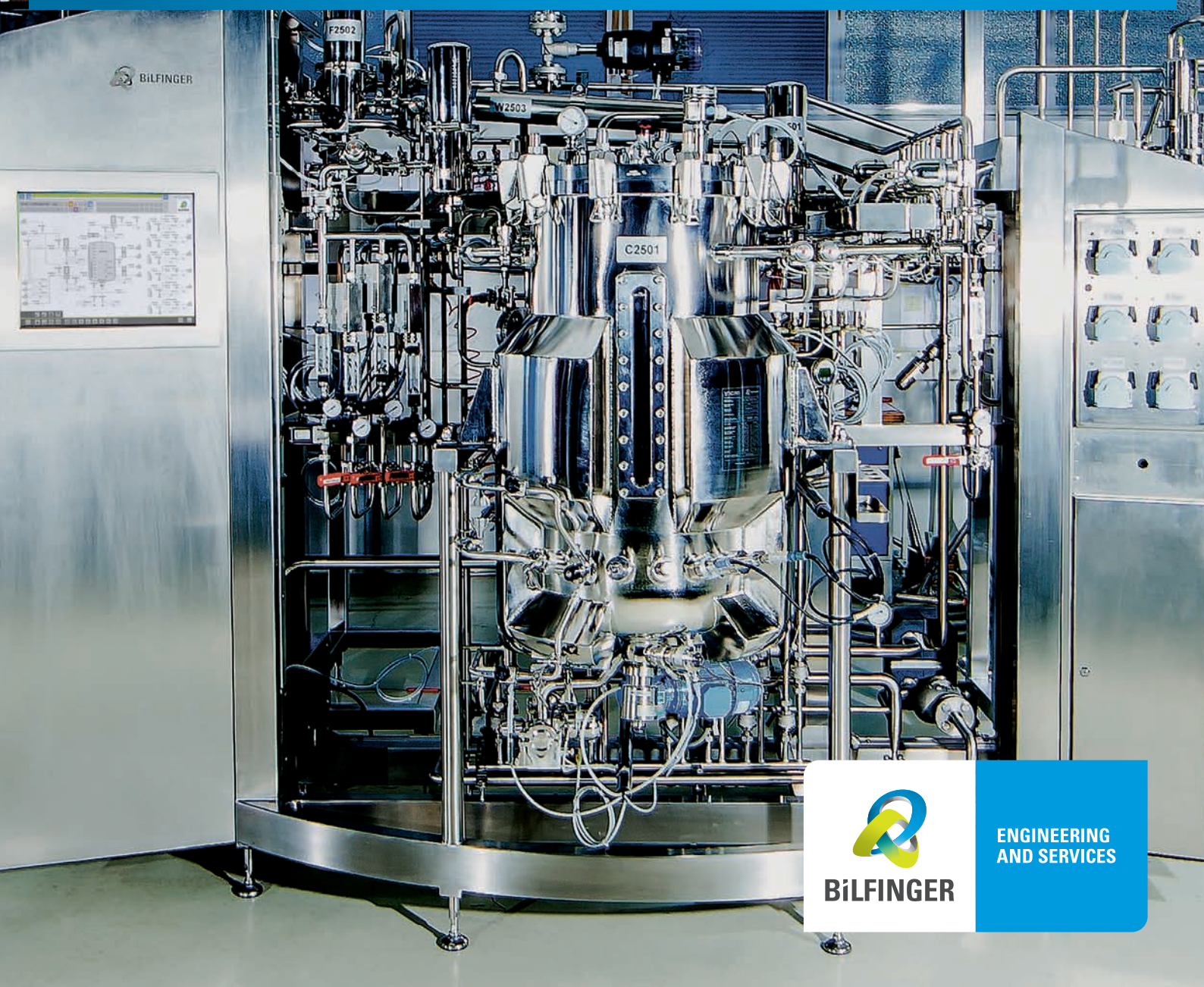

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