



# BIOBASE

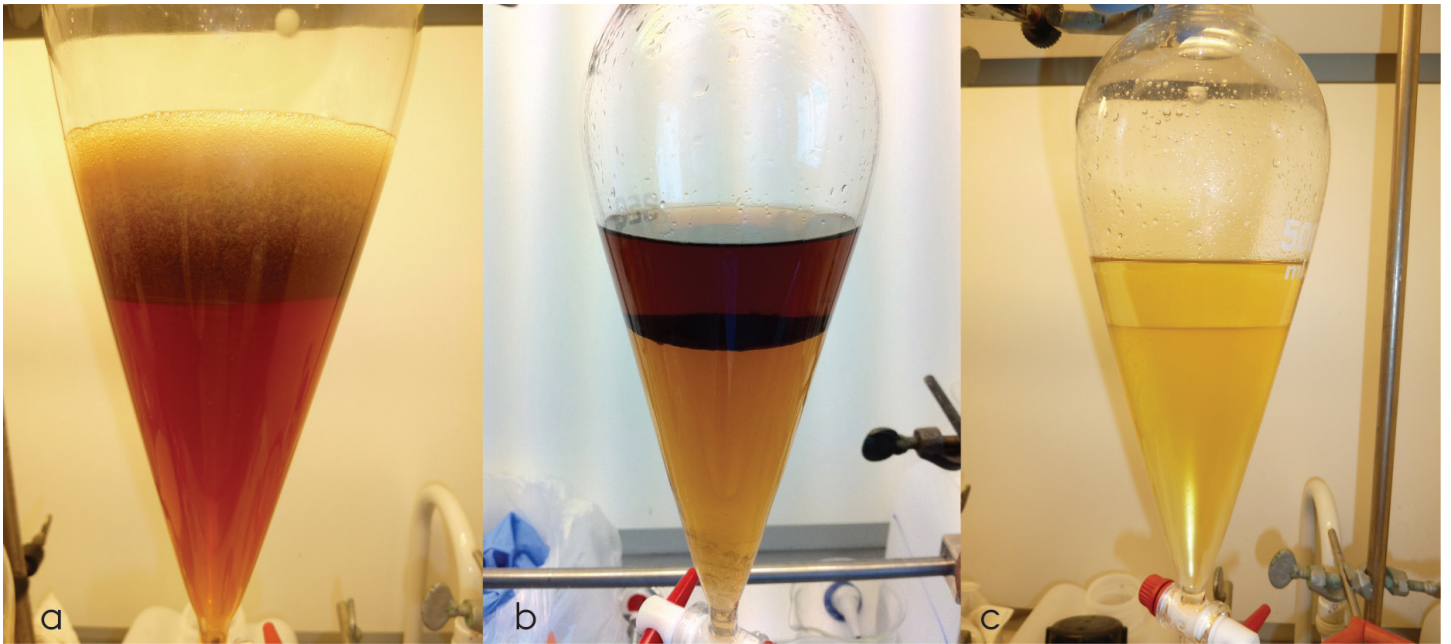
PLATFORMS FOR RESEARCH IN THE USE OF RENEWABLE RESOURCES



AARHUS  
UNIVERSITY

DCA - DANISH CENTRE FOR FOOD AND AGRICULTURE





Increased application of biomass in the production of energy, feed, food, materials and chemical raw materials entails considerable perspectives for society and industry. Among other things, the use of renewable resources may reduce the reliance on fossil fuels and the import of feed for the Danish livestock production. The development of new biobased products may contribute to the establishment of a sustainable industrial growth as well as more jobs in rural districts. Finally, the development of new, green biomasses and refining methods will reduce the environmental impact from agriculture and improve soil fertility – without reducing food production.

#### RESEARCH PLATFORMS AT AARHUS UNIVERSITY

At Aarhus University a technology platform has been established, acting as a framework for research and development of production systems and technologies in relation to the refining of green biomass. Until 2017 an amount of 50 million DKK will be spent on these platforms, which are supposed to provide a new basis for research in sustainable, biobased production of liquid fuels, new high-protein feed and other high-value products. At the same time the platforms will constitute the foundation for development cooperation with companies.

The platform consists of four integrated sub-platforms:

- Green biomass via diversified land use and intelligent management (Green biomass)
- High-quality protein from green biomass (Green protein)
- From biomass to energy by means of HTL (HTL)
- Social and environmental, organic and economic evaluation (ECO-ECO)



## GREEN BIOMASS

### Research platform for diversified land use and intelligent management

This platform comprises two coordinated activities focusing on research in cultivation methods and the development of technology for the management and extraction of biomass from extensive areas, respectively.

### CULTIVATION SYSTEMS IN RELATION TO CROP ROTATION AREAS

It is a major challenge to produce both sufficient food and biomass for energy and materials while maintaining soil carbon content and other sustainability parameters. However, the project hypothesis is to double the productivity per area unit compared to current grain crops by applying innovative cultivation methods that take advantage of the entire growth season.

The platform provides the opportunity to examine new biomass cropping systems and compare these with traditional crop rotations in relation to e.g. yield, bio refining quality, nitrate leaching, soil carbon content, weed flora, diseases, pests etc.

Coordinator: Uffe Jørgensen, Department of Agroecology

### BIOMASS FROM PASTURE AREAS

This research platform constitutes the basis for research in substantive solutions for designation, registration, harvest, collection, processing, transport and logistics, and utilisation of biomass grown on extensive agricultural and natural areas for energy, fertilization and bio-refined materials.

The platform supports the development and implementation of technological and system-optimising solutions. Technological possibilities for a sustainable application of biomass will be demonstrated.

Coordinator: Claus Grøn Sørensen, Department of Engineering

## GREEN PROTEIN

### Research platform for the development of protein from green biomass

Green biomass offers a huge and untapped potential for the production of protein for food and feed. This platform includes laboratory and technology platforms for the development of extraction and analysis methods to support optimised fractionation of protein and other high-value compounds.

One major focus is to optimise methods for the extraction of protein from green biomass (legumes and grasses) at laboratory and pilot scale. Another major focus is the characterisation of the extracted protein by means of chemical and biological methods as well as studies of stability and bioavailability. In addition, the application of compounds from processing side streams will be examined.

The platform will support the development and establishment of a pilot plant in cooperation with the Department of Engineering.

Coordinator: Knud Erik Bach Knudsen, Department of Animal Science

## HTL

### Hydrothermal conversion of wet biomass to liquid fuel

The research efforts of this platform will support the design and construction of a pilot plant for hydrothermal conversion of biomass to fuel that can blend with or even substitute for fuels. The pilot plant is designed in order to accommodate a subsequent up-scaling to demonstration and full-scale levels.

The plant will facilitate research in the conversion of a significant number of wet lignocellulose by-products and energy crops from agriculture and industry.

Further, chemical analyses of fractions and eco-toxic evaluation of by-products will be accomplished.

Coordinators: Anders Peter Adamsen & Ib Johannesen, Department of Engineering

## ECO-ECO

Social and environmental, organic and economic evaluations  
Based on data from the other platforms, this platform aims to establish a foundation in order to illustrate the environmental and socio-economic consequences of an increased biomass production as well as an increased production of biobased products in a broader sense. In relation to particularly promising technologies detailed environmental and socio-economic analyses of the consequences will be carried out prior to implementation.


The platform will support the building of interdisciplinary competences within social, environmental-economic and organic-economic analyses, including life cycle evaluations, and incorporate these tools in complete analyses of potentials and challenges in the bio economy.

Coordinator: John E. Hermansen, Department of Agroecology



## COOPERATION ON THE DEVELOPMENT OF BIOBASED PRODUCTION

Via the research platforms Aarhus University cooperates with companies, organisations, authorities and other knowledge institutions on the further development of the use of renewable resources for biobased production. Contact DCA - Danish Centre for Food and Agriculture for further information on cooperation opportunities.

In 2013 a new project was initiated in Denmark -  Value - the new value chain in the biobased society of the future; funded by the SPIR initiative. The project aims to gather a series of research environments and companies in a joint effort. Read more at [www.biovalue.dk](http://www.biovalue.dk)

An industrial cluster - Biocluster.dk - has been established in cooperation between Agro Business Park, Danish Agriculture and Food Council, Region Midtjylland (Central Denmark Region), Viborg Municipality and Viborg Erhvervsråd (Viborg Business). This cluster provides access for companies to knowledge and facilities established in relation to BioBase. Read more at [www.biocluster.dk](http://www.biocluster.dk)



AARHUS UNIVERSITY

### CONTACT INFORMATION

DCA - Danish Centre for Food and Agriculture  
Aarhus University  
Blichers Allé 20  
P.O. Box 50  
DK-8830 Tjele  
Tel.: 8715 6000  
E-mail: [dca@au.dk](mailto:dca@au.dk)  
[www.dca.au.dk](http://www.dca.au.dk)