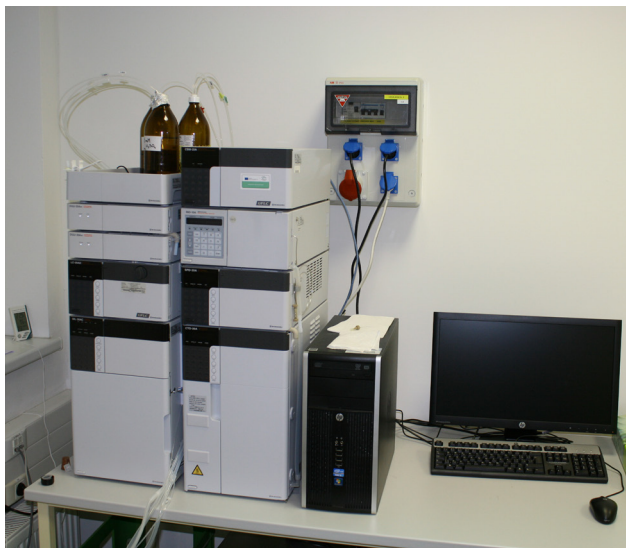


Services

- We provide basic analyses of samples of raw materials supplied by potential customers. Based on the results of preliminary analyses we work out a realistic estimate of the major production cost for the desired final product (s) and production capacity;
- we offer the opportunity to test large quantities of raw material for a demonstration pilot plant with a daily processing capacity of approximately 100 kg of waste fats and oils. The pilot unit is equipped with computer control of the transesterification reactor;
- based on the results of pilot-scale tests will prepare a detailed economic balance the potential of our technology solutions developed for the processing of raw materials to individual customers.

Our workplace is well-equipped with the following devices:



HPLC chromatograph Shimadzu LC20 with autosampler, UV-VIS and refractometric detector



Combustion gas analyser TESTO



Melting point analyzer Stuart SMP40



Titrator Mettler Toledo T50



Viscometer Brookfield LVDV-II Pro

 Tomas Bata University in Zlín
Faculty of Applied Informatics

 **CEBIA-Tech**
Centre for Security, Information
and Advanced Technologies



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**RESEARCH PROGRAMME 3:
„ALTERNATIVE ENERGY SOURCES“**

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**We are looking forward to
future cooperation!**

www.cebiam.utb.cz

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EUROPEAN UNION
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OP Research and
Development for Innovation

R&D Orientation

Regional research centre for security, information and advanced technologies (RRC CEBlA-Tech) was established under the OP Research and Development for Innovation. It represents a dynamic opportunity for further development of R&D in the Zlín region in the field of applied informatics, security technologies and alternative energy sources. RRC CEBlA-Tech is part of the Faculty of Applied Informatics, Tomas Bata University in Zlín. One of the primary goals was to build a top-ranking workplace with quality instrumentation and laboratory equipment. Scientific and research activities of the Centre are focused on the following areas:

- grid computing and application of artificial intelligence;
- intelligent production systems;
- intelligent buildings;
- embedded systems;
- development of small mobile data and telecommunication networks for emergency units;
- development of systems for the detection and analysis of hazardous substances using THz frequencies;
- development of techniques for the protection of electronic systems against interference by external and internal electromagnetic fields (EMC);
- **alternative energy sources.**

For more details, please visit:

**[www.utb.cz/fai-en/structure/
regional-research-centre-cebia-tech](http://www.utb.cz/fai-en/structure/regional-research-centre-cebia-tech)**

The research programme Alternative energy sources is fully focused on the development of specific technologies that have direct application in industrial practice. There are two parallel research activities - production of biodiesel from waste fats and oils, which also includes methods of pretreatment of the input raw materials, and the development of optimized catalytic systems and recycling technologies that enables economically profitable and mainly environmentally clean operation.

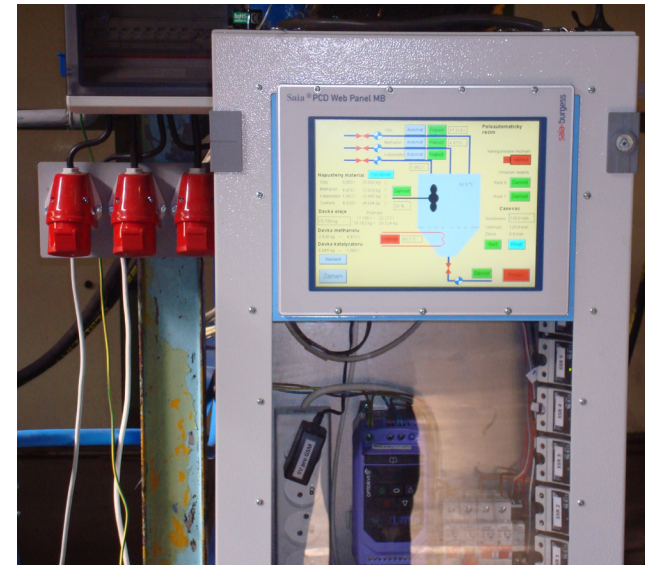


Technology of biodiesel production from waste fats and oils

We have developed a clean and economically viable patented technology of biodiesel production from waste materials. The technology processes waste fats and oils using an innovative catalytic system based on a mixture of organic bases. The technology can be used for the processing of companies' own waste fats (tanneries, slaughterhouses, rendering plants, food industry), collected waste (fats and oils from restaurants, households, etc.), but also for the production of biodiesel from traditional raw materials (vegetable oils).

Basic aspects of the technological solution are as follows:

- practically waste-free technology;
- functional pilot unit;
- the resulting biodiesel is in accordance with EN 14214;
- favorable economic balance;
- commercially interesting by-products;
- „tailored“ - adjustable for different feedstock and the required production capacity.



Awards

Technological solutions have been independently awarded at two prestigious domestic competitions:

In 2012, a team led by Prof. Karel Kolomazník was placed among the top three finalists in the competition Czech Innovation 2012 in the category “Innovative idea” for “Innovative catalytic-reaction system for biodiesel production from waste fats and oils”.

In the same year, the team led by Prof. Kolomazník made it among the top three finalists in the competition Werner von Siemens Excellence Award 2012 in the category Best result of development / innovation with technological solutions „Technology for complex processing of tannery waste fats“.

Main assets of the technology

Thanks to efficient pretreatment of raw materials and innovative catalytic system based on organic bases, our technology allows processing waste fats and oils of even very poor quality while maintaining economic benefits and minimal impact on the environment. Great advantage for users is flexibility of the technology in terms of:

- **processed feedstock** (fats and oils of various quality and origin – beef tallow, pork lard, rendering plant fats, yellow grease, etc.);
- **production capacity** (the technology can be scaled to a wide range of daily production capacity, from tens of kilos to tons);
- **available production equipment** (the production unit can be made brand new as well as assembled with minimal costs from the existing production equipment, e.g. for biodiesel production from rapeseed oil catalyzed by alkali metal methanolates).

Due to the presence of organic bases, the final products (biodiesel and glycerin) contain practically no soaps, thereby the costs for their purification are substantially reduced. Great benefit not only from the economic, but also environmental point of view, is partial regeneration of the catalytic system components, which can subsequently be re-used in the production.

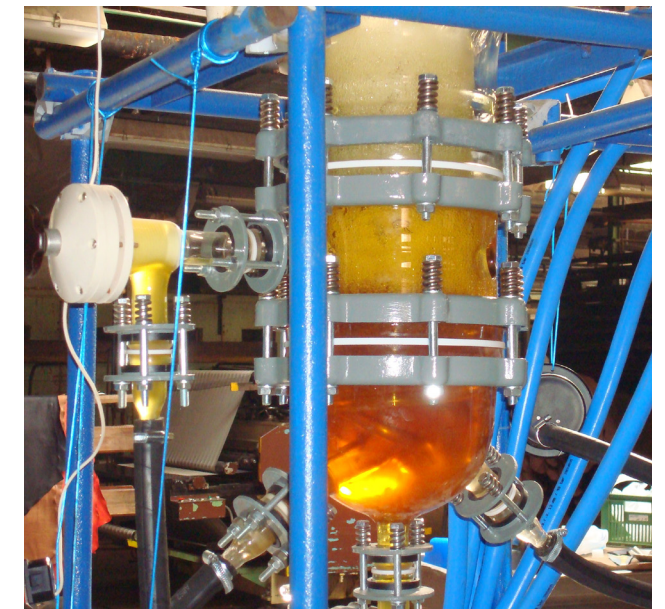


Economic parameters

- Low (or negative) price of the feedstock;
- waste-free processing - maximal utilization of raw materials and chemicals;
- reduction of costs associated with purification of output products (quality of final products is comparable to conventional technologies at reduced costs);
- high added value and competitiveness of the final products;
- in some cases, existing technological equipment can be used with minimal modification, which brings a further reduction in production costs.

Benefits for users

- Ecological processing of own unpleasant, potentially hazardous waste in the companies, reduction of expenses related to their disposal;
- possibility of making the companies' own biodiesel and thus saving the costs of internal transportation;
- depending on the feedstock used, there is a possibility of utilization also its non-fat components (in particular the protein fraction) for valuable products (gelatin, fertilizers, biostimulators, etc.).



The obtained biodiesel can also be used as fuel for diesel units producing electric power. We carried out testing of about 500 kg of biodiesel produced by our technology on a diesel unit and no significant differences were found compared to conventional diesel. Conversely, a positive cleaning effect was observed, when previously settled carbon was removed; similar results were obtained during the tests of our biodiesel in diesel engines of modern agricultural machinery.