

## Technology Offer

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# Technology for bioethanol production from wood using simultaneous saccharification and fermentation (SSF) method

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## Summary

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*A Romanian research institute has developed a technology for obtaining bioethanol from wood, by simultaneous saccharification and fermentation (SSF) method. Industrial partners active in biomass and biofuel production are sought for, in order to develop, validate and introduce the new technology into production, for commercial agreement with technical assistance (engineering and technical assistance).*

<b>Creation Date</b>	20 January 2016
<b>Last Update</b>	15 February 2016
<b>Expiration Date</b>	15 February 2017
<b>Reference</b>	TORO20160120001

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## Details

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### Description

A Romanian research institute with a remarkable endowment that allows the approach of projects from research to the prototype realisation and technological transfer has developed a technology for obtaining bioethanol using simultaneous saccharification and fermentation (SSF) of wood. This method combines two processes into one.

The Romanian institute is specialized on the development of technologies for biofuel obtaining (bioethanol, biodiesel and biogas) from renewable resources, as well as on application of extraction techniques for extraction and characterization of different products and co-products. The technology for converting wood into bioethanol using simultaneous saccharification and fermentation consists in the following steps:

- steam-explosion pre-treatment at high temperature and pressure;
- enzymatic hydrolysis and fermentation of cellulose into bioethanol;
- distillation of bioethanol.

In other foreign countries, there are facilities for the production of first generation biofuels, which include ethanol produced from corn and sugar beet and biodiesel, but there are no industrial plants producing bioethanol from cellulosic biomass (mainly sawdust). Bioethanol is produced by fermenting sugar made from grain that is enzymatically hydrolyzed to monosaccharides and then fermented with yeast from bioethanol. Abroad there are not industrial plants producing bioethanol from cellulosic waste saccharification method simultaneously with fermentation.

There are plants of reduced capacity that produce biofuel by this method.

In Romania there is no other technology for producing bioethanol from waste cellulose (sawdust) by saccharification simultaneously with fermentation, and there are no industrial plants or small capacity to operate and produce fuel from waste cellulose (sawdust).

The Romanian research institute is looking for industrial partners, in order to develop, validate

and introduce the new technology into production, for commercial agreement with technical assistance (engineering and technical assistance).

## Advantages and Innovations

- Bioethanol is an attractive alternative fuel because it is a renewable bio-based resource and it is oxygenated thereby provides the potential to reduce particulate emission in compression-ignition engines;
- The pre-treatment of wood enhance the accessibility of the wood to the enzymes;
- SSF method combined the enzymatic hydrolysis and fermentation of sugars in a combined step;
- SSF method gives higher bioethanol yields and requires lower amount of enzyme because end-product inhibition from cellobiose and glucose formed during enzymatic hydrolysis is relieved by the yeast fermentation;
- SSF technology increase of hydrolysis rate by conversion of sugars that inhibit the cellulase activity;
- Lower requirements for sterile conditions since glucose is removed immediately and bioethanol is produced;
- Shorter process time.

## Stage of Development

Under development/lab tested

## IPR Status

Patents granted

## Comment Regarding IPR status

Patent granted in Romania by the State Office for Inventions and Trademarks.

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## Keywords

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### Technology

04005003	Liquid biofuels
04005006	Solid biomass

### Market

06003009	Biomass and Biofuels
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### NACE

M.72.1.9	Other research and experimental development on natural sciences and engineering
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## Network Contact

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### Issuing Partner

NATIONAL INSTITUTE OF RESEARCH AND DEVELOPMENT FOR OPTOELECTRONICS

### Contact Person

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**Open for EOI :**    **Yes**

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**Dissemination**

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**Send to Sector Group**

Intelligent Energy

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**Client**

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**Type and Size of Organisation Behind the Profile**

Industry SME 50-249

**Year Established**

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**Already Engaged in Trans-National Cooperation**

No.

**Languages Spoken**

English

**Client Country**

Romania

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**Partner Sought**

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**Type and Role of Partner Sought**

Type of partner sought: companies active in biomass and biofuel production

Specific area of activity of the partner: biofuel

Task to be performed by the partner sought: development, validation of technology and industrial production of bioethanol. The Romanian research institute offers technical assistance for technology adaptation and bioethanol production.

**Type and Size of Partner Sought**

SME 51-250

## Type of Partnership Considered

Commercial agreement with technical assistance