

SECOND GENERATION BIOFUELS

ATENEA PROJECT

Bioethanol from Citric Wastes



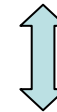
2nd Stakeholder Plenary Meeting of the European Biofuels TP
Brussels, 22nd January 2009

Caterina Coll, Rafael Castañeda, Vicente Signes

Good yields in Combustion Engines

Clean Combustion

Good miscibility with other fuels i.e. petrol



Versatility

Usage possibilities in Otto engines: usuals, FFVs, ethanol exclusives, and e-Diesel engines

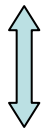
Bioethanol

Free from Special Hydrocarbons Taxes



Favour the implantation of the logistics and technology

Liquid Biofuels



**Solid and
Gaseous fuels**



**Storage facilities, compatible
with current infrastructures,
logistics...**

Biomass: CO₂ drain

Decrease of Greenhouse
Gases emissions

Bioethanol

One of the most value-added products
that can be obtained from **celulloses**
and **lignoceluloses**

Wide Feedstock spectrum

Forestry remains, Agricultural wastes,
Municipal Solid Wastes

WASTES

Renewable Resource

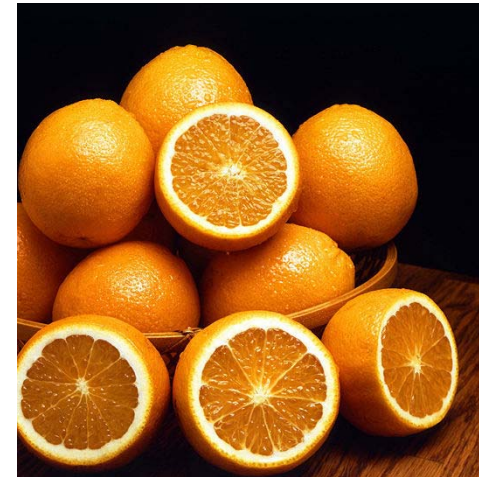
Every liter petrol extracted,
every liter petrol *exhausted*

**Valencian country
Problem**

Agricultural sector: citric residues

Juice Industry: Peel wastes

**Wastes with
lignocellulosic
component**



IMECAL has evaluated the conversion of these citric wastes to ethanol, and the modifications required in PERSEO Plant to allow semi-industrial evaluation

2007: Atenea Project. Bioethanol from citrus waste



GENERALITAT VALENCIANA
CONSELLERIA D'INFRAESTRUCTURES I TRANSPORT

PROYECTO ATENEA

PLANTA EXPERIMENTAL

**Producción de BIOETANOL a partir
de RESIDUOS DE CÍTRICOS**

Promotores:

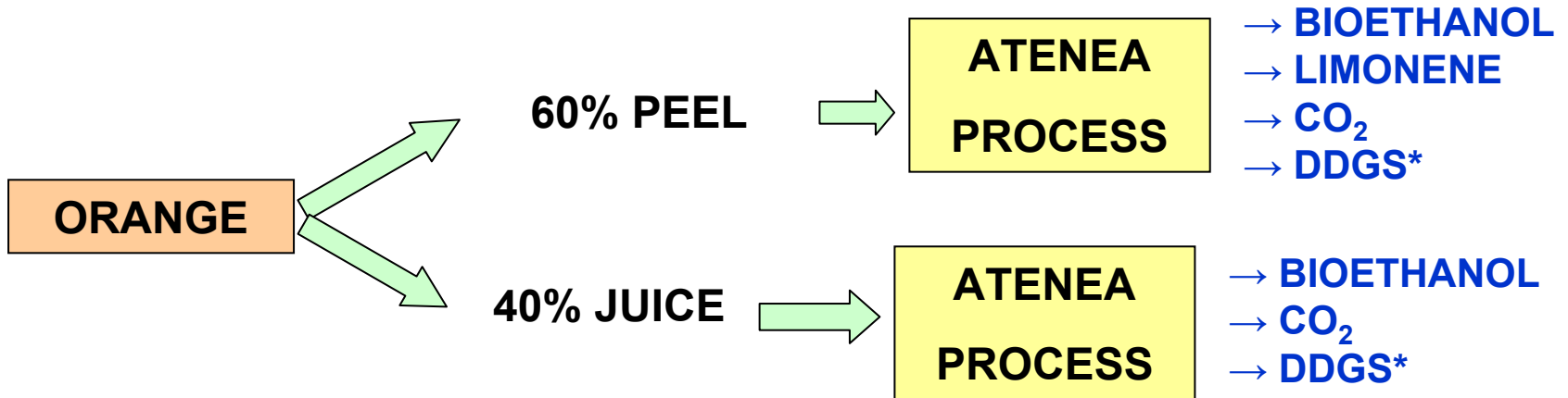
Ciemat
Centro de Investigaciones
Energéticas, Medioambientales
y Tecnológicas



Colaboran:



ATENEA Process



*Distilled Dried Grain Solubles.

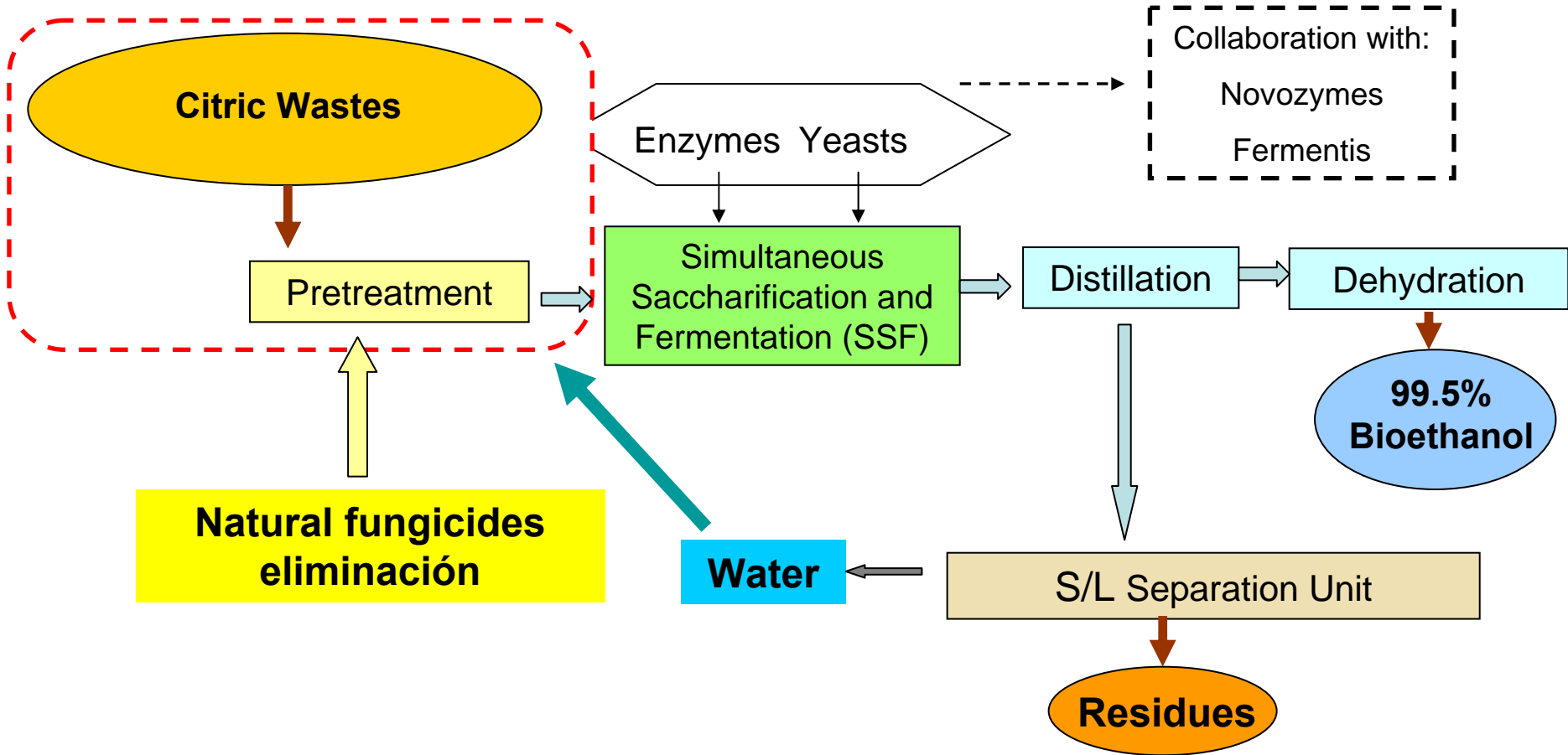
Semi-industrial Second Generation Bioethanol Plant:

- Intermediate lab-to-industrial size tests.
- Engineering and Process problems Detection and Solving.

Versatile Experimental Plant:

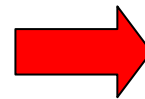
- Processing of different types of lignocellulosic materials.
- Allows semi-industrial bioethanol process optimization for every feedstock.

ATENEA Process





PERSEO Demonstration plant.
L'Alcúdia, Valencia



Adapting to
ATENEA

Process Units

Simultaneous Saccharification and Fermentation Unit.



Distillation Unit

Two distillation units:
Rectification tower and Azeotropic tower.

Technology developed in IMECAL.



Laboratories

Pilot Plant laboratories where predeterminate Process Parameters and evaluate plant operation results.



ATENEA Project:

ATENEA current results:

Up to date, ATENEA project has finished the first stage involving:

- The completion of the laboratory parameters determination
- The performance of the basic and detail engineering

Currently, IMECAL is involved in ATENEA second stage, building up the new tanks, pipes... annex to PERSEO plant, and further pilot plant evaluations to generate economic balances



THANK YOU FOR YOUR ATTENTION