Adding Value to Biofuels

24/06/2013

Brussels

pangea

Global Bioenergy Partnership
Biodiesel Background

- **28/2003/EC mandatory blending targets** (4→10% by 2020):
  - Unexploited refining capacity, premium for no-food feedstocks
  - Lack 20 million tons of competitive and sustainable vegetable oils for biodiesel/bio-jet fuel production

![World Biodiesel production](chart.png)

- **20 Mtons of un-utilized production capacity**
  - ≈ Italian Diesel Consumption
Overview of Jatropha sector 1/2

- **Jatropha** is a hardy shrub from Central America, spread all over Sub-Tropics by Portugueses.

- Traditionally used as living fence to protect cash crops due to its toxicity and for soap production.

- Seeds contain approx. 34% of oil suitable for biofuels (SVO, biodiesel, Bio-jet fuel).

- In 2006, cultivations of Jatropha started by thousands of organizations worldwide.

- In 2008-2010, Air New Zealand & TAM performed flight tests on Jatropha bio-jet fuel.

Overview of Jatropha sector 2/2

- **In 2008 GEXSI’s report**: 900 kHa under cultivation by 242 projects and forecasted 12 million Ha by 2015

- **In 2011 Luneburg Univ.**: 1,2 mHa by 139 projects

- **Reasons for slow down**:
  - Lower (than expected) yield → Low Revenues per Ha
  - Financial turmoil
  - Lower fossil fuel prices
  - Environmentalist concerns (land grab, land competition)

- **Major projects under development**:
  - China, India, Malaysia, Indonesia: 860 kHa (72% of total cultivated area)
Partial disaffection by Private sector, growing interest by Scientific Community

Int. Research on Jatropha

PATENTS

SCIENT. PUBLICATIONS
Jatropha improvements

- **Improvement of Oil quality**
  - High acidity (> 6-7%)
  - High Phosphorus content
  - Stability at high temp. & moisture

- **Valorization of Solid Co-product:**
  - 80% of fruits
  - not properly valorized due to anti-nutritionals
  - kernel proteins content > 50%

- **Separation of valuable bioactives**
  - Curcin as potential anti-tumoral
  - Stabilization issues

Jatropha fruit composition (%)

Solid co-product: 80%

Oil: 20%
• **Agroils** developed an innovative process (**Patent pending**) to produce:

1. Superior quality oil (lower acidity, higher stability, lower P)
2. Feed for ruminants (toxin & anti-nutrients removal)
3. Protein isolate for technical applications (emulsifier)
4. Valuable bioactives (Curcin, potential anti-tumoral)

### Economics Jatropha producer

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<thead>
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<th>€/Ha</th>
<th>Business as Usual</th>
<th>AGROILS</th>
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<tr>
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<td>Profits</td>
<td>Costs</td>
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**Patent:** 13282106  
**PCT Num:** US1157896
Use of Jatropha meal

- Removal of Phorbol esters < 3 ppm
- No growth difference on fish, ruminants, poultry when substituting Jatropha detoxified cake to soy meal
- Average annual growth of Soy importation in Dev. Countries and LDC: > 5%

Source: Hohenheim University

Soy meal gap in Southern Africa

Protein Meals Market Value

USDA FAS
Company Achievements

- **Apr. 2011:** R&D in Hayward, CA, incorporation in Florence, IT
- **Mar. 2012:** $1,2 M USD Series A Round
- **May 2012:** Pilot plant in Santo Domingo, DR
- **Dec. 2012:** $500 k USD Grant from Region of Tuscany
- **Jan. 2013:** Detoxification of cake achieved (PE < 3 ppm)
- **Feb 2013:** Successful completion of Test in vivo with ruminants
- **May 2013:** Validation of oil quality for biofuels production
Internat. Tech. Cooperation
Dominican Rep.

- Founding partner of a local Biodiesel company - BIND Sarl - in 2011
- BIND’s mission: production of biodiesel from Jatropha, waste oils & animal grease
- 2011 Incorporation and Setup of biodiesel pilot plant (1,500 tons cap.)
- 2012 production: 500 tons
- 2013 production: 1,500 tons (forecasted)
- In S. Domingo Agroils installed a demo plant for proof of concept of the new process (annual capacity 2,000 tons) integrated with the exiting biodiesel plant.
Dominican Republic

BIND biodiesel process from waste oils
In Dominican Republic:
- Recovery and valorization of 2,000 tons of used vegetable oils
- Reduction of approx. 6,000 tons of CO2
- Improvements of combustion emissions (low Sulphur content)
- Improvement of competitiveness and sustainability for 40 local companies
- Employment of 30 local people (4 technicians)
- Improvement of feed quality due to reduction of Health Hazardous (i.e. Dioxins)
The Team

Giovanni Venturini Del Greco, CEO
- Founder Agroils Srl (Exit ’11, brand Agroils owner)
- Founder 5 biofuels JV in ACP Countries
- Chairman Jatrophabook assoc. (+2,000 subscribers)

Roberto Crea, Chairman & Chief Scientific Officer
- Inventor Synthetic Insulin, ex-Genentech partner, 35 patents
- Creative Bio Molecules, Bioren (acquired by Pfizer), Neurex (acquired by Elan in ‘98 for $700 M), Protelix, Creagri

Antonio Mele
- PhD Chemistry Pavia, former VP Biotech Menarini Pharma (IT)
- In US: PHRI NY, Creative Biomolecules Inc., Hopkinton, Menarini Pharma (IT)

Carlos Urbaez, Company Manager in DR
- Mechanical Engineer, Biofuels Manager at BIND Sarl
THANK YOU!

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