



# Centro Nacional de Producción Más Limpia

## GREEN CHEMISTRY IN COLOMBIA

Carlos Fernando Cadavid, Juan Gregorio Correa  
and Natalia Echavarria


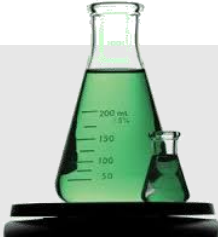


[www.cnpml.org](http://www.cnpml.org)

# Potential pilot demonstrations



Centro Nacional de  
Producción Más Limpia

Project Name / Topic	Description	Stakeholders
Colombian Biofuel programme	Fostering the diversification of the energy market through the use of biofuels	Ministry of Mines and Energy of Colombia
Essentials oils	Products composed of essentials oils: E.g. Degreaser and Dishwasher	
 Green solvents	Product line Greencosol low toxicity and low environmental impact (Removers and Coalescing).	ANDERCOL
	markets Green solvents as INDOL TRADE MARK	NOPCO COLOMBIANA
	Products for Cleaning and Washing Cars and Planes based on D-limonen	NTF (Nuevas Tecnologías Fícoquímicas) and Ecobles
BIOPOLYMERS	Thermoformed cups based on PLA (Poli Lactatic Acid) for Avianca's clients.	Pilot project between the Airline company Avianca and Phoenix Packaging Group



Centro Nacional de  
Producción Más Limpia

# Obstacles and opportunities

- Opportunities:

- Bio basic chemicals (Biodiversity resource)
- Green solvent
- D-Limonen (Lemon, Orange and Tangerine)
- Lactic Acid from Milk
- Functional water
- Biopolymers
- PLA (Poli Lactic Acid)

- Obstacles:

- Financial resources
- Task incentives (Lack)
- Few people have worked in GC in Colombia (23 Research Groups)



[www.cnpml.org](http://www.cnpml.org)



Centro Nacional de  
Producción Más Limpia

# Green chemistry in leading academies

## • Main college degree

University	Program
Universidad de Antioquia	PhD in biotechnology
Universidad Pontificia Bolivariana	<ul style="list-style-type: none"><li>• PhD in biotechnology</li><li>• Magister in biotechnology</li><li>• Specialist in Environmental Engineer</li></ul>



## • Main signatures in college degree

University	Program	Signature
Universidad Jorge Tadeo Lozano	Chemical Engineer	Green Chemistry (Optional signature)
Universidad Pontificia Bolivariana	<ul style="list-style-type: none"><li>• Environmental Engineer</li><li>• Chemical Engineer</li></ul>	Green Chemistry
Universidad de la Sabana	<ul style="list-style-type: none"><li>• Chemical Engineer</li><li>• Magister in process design and management</li></ul>	Green Chemistry (Optional signature)
Universidad de Antioquia	Chemical Engineer	Biotechnology



# Green chemistry in leading academies



Centro Nacional de  
Producción Más Limpia

- Training Education

1. Universidad de Antioquia. Course Introduction to green chemistry. Medellin, 2013.
2. NCPC Colombia. Some Training workshops in Green Chemistry courses and specially in the Specialization-Master in Environmental Engineering and Degree of Chemical Engineering with the Universidad Pontificia Bolivariana in 2016 .
3. Universidad Industrial de Santander. Seminar on green chemistry in 21<sup>th</sup> century. Bucaramanga, 2006.
4. Universidad del Cauca. Conference "The future of chemistry: Green chemistry for Colombia". 2011.
5. Universidad de la Sabana. I Workshop on Green Chemistry. Bogotá, 2011.
6. Universidad de Antioquia. IV Simposio : Green chemistry . Medellín, 2012



[www.cnpml.org](http://www.cnpml.org)



Centro Nacional de  
Producción Más Limpia

DESARROLLO EMPRESARIAL SOSTENIBLE

**GRACIAS**



/CNPMLTA  
correo@cnpmml.org - www.cnpmml.org

Teléfono: + (57 4) 460 17 77 Fax: + (57 4) 513 09 30

Cra. 46 N° 56 - 11 piso 8 Edificio Tecnoparque  
Medellín - Colombia



[www.cnpmml.org](http://www.cnpmml.org)

DESARROLLO EMPRESARIAL SOSTENIBLE