



**CORPORATION FOR THE INDUSTRIAL
DEVELOPMENT OF BIOTECHNOLOGY
AND CLEAN PRODUCTION**

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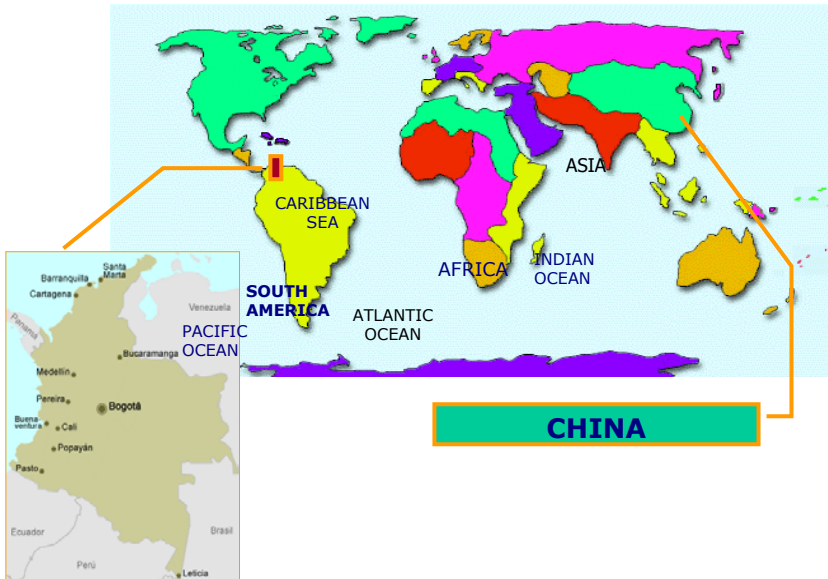
INTERNATIONAL BIOENERGY FORUM

**BIODIESEL PRODUCTION FROM
AFRICAN PALM IN COLOMBIA**

**Guangzhou, CHINA
28-30 SEPTEMBER, 2003**



COLOMBIA, SOUTH AMERICA

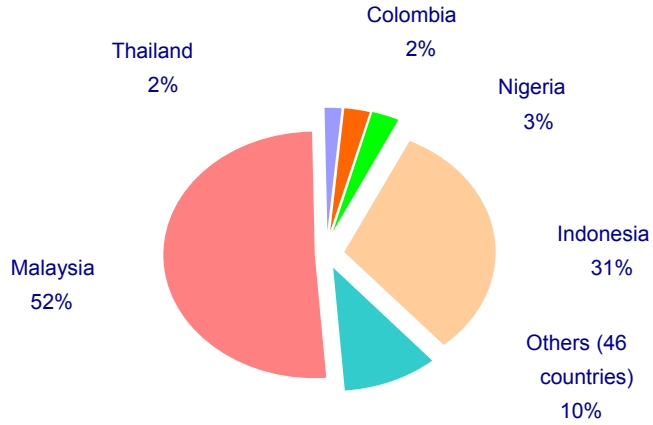


OIL PALM CONDITIONS

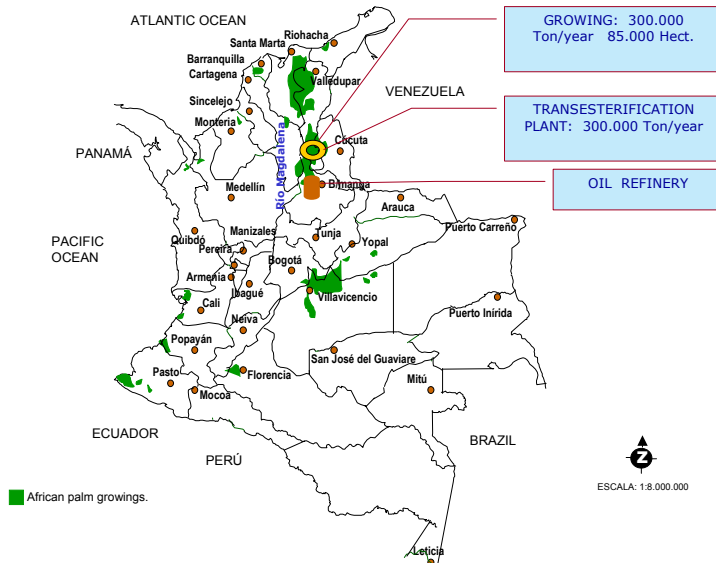
Nowadays, there are five million hectares of palm in world, which represent 16 million tons of production per year, which is equivalent to a consumption of 1,7 kilo per capita. Colombia is the fourth producer (2%) of oil palm in world, after Malaysia (46%), Indonesia (31.3%) and Nigeria (5.1%).

Oil palm growings in the country have had a very important development. Nowadays, there are 170.000 hectares and palm crude oil production increases up to 547.000 tons/year.

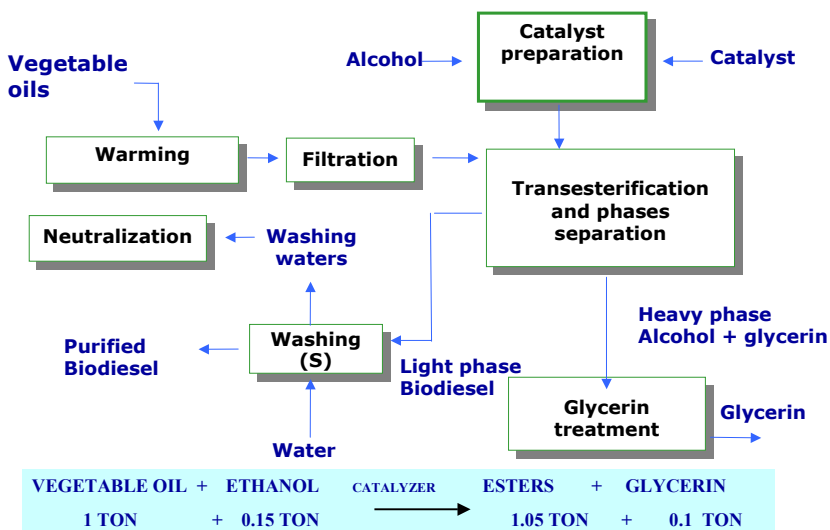
PALM OIL WORLD PRODUCTION, 2001 (TONS/YEAR)



OIL PALM GROWINGS AGROINDUSTRIAL COMPLEXES BIODIESEL PRODUCTION



BIODIESEL OBTENTION FROM VEGETABLE OILS



REGULATORY FRAME

- Colombia counts on Fuel Alcohol Law (693 de 2001) and on a wide government support in the use of renewable fuels.
- From 2005, Colombian gasolines should be oxigenated with sugar cane alcohol and others(Law 693 of 2001).
- Wide government support to energy agriculture: sugar cane, yuca, African Palm.
- African palm is the best raw material for Biodiesel production in Colombia.
- B10 (10% biodiesel in markets) requires 6.000 BPD of biodiesel (300.000 Ton/year)

ECONOMIC TECHNICAL STUDY

Colombia produces about 60.000 barrels/day of Diesel fuel oil for vehicles. Upon using a 10% of esterified vegetable oil, it will be equals to 6.000 barrels/day, approximately 300.000 tons/year of palm oil, figure near to 50% of the year national production generating 100.000 Hectares grown in African palm and more than 100.000 direct and indirect employments.

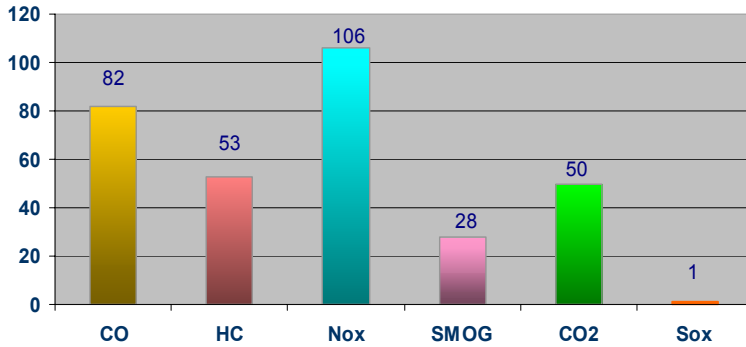


TECHNICAL ECONOMIC STUDY

Due to during last years Diesel fuel oil price has been lower than gasoline price, the country has become to use Diesel, so the maximum possible Diesel fuel oil production of Ecopetrol is getting close to demand, which means that if there are not new oil refineries, the country will have to import Diesel fuel oil during next years. Biodiesel will avoid said import with meaningful currency savings.



**BIODIESEL vs. PETRODIESEL EMISSIONS REDUCTION.
(B20)**



University of Idaho and the German company Mercedes Benz. 1994.



TECHNOLOGIES

COMPANY NAME	COUNTRY
HENKEL	GERMANY
ESTERFIP	OIL FRENCH INSTITUTE
ESTERECO	ITALY
BALLESTRA	ITALY
OCEAN AIR ENVIRONMENTAL	UNITED STATES
PACIFIC BIODIESEL	UNITED STATES



BIODIESEL PROJECT IN COLOMBIA

PLANT CAPACITY	150.000 TON/YEAR OF BIODIESEL (5% of Biodiesel in Diesel)
INVESTMENT	16 MUSD
LOCATION	BARRANCABERMEJA
OPERATIONS BEGINNING	2007
RAW MATERIAL PRICE	320 USD/TON PALM OIL
TIR	> 20%
BIODIESEL PRICE	1.25 USD / GALLON
A 4% INCREASING IN DIESEL PRICES IS REQUIRED (2002)	



BIODIESEL PRODUCTION IN EUROPE IN RELATION TO COUNTRY AND COMPANY, 2000.								
COUNTRY AND PRODUCTION	COMPANY (TECNOLOGY)	PLACE	CAPACITY SIZE	MARKET DIVISION			USED OIL	PRODUCTION STARTING
				OLEOCHEMISTRY	BIODIESEL	MIXTURE 2/9/30%		
GERMANY 415.000	Henkel	Dusseldorf	200	160	0	0	0	?
	Connerman	Leer	100	10	75	10	0	91/93/95
	Oelmühle Hbg/ADM	Hamburg	100	10	60	20	0	99/00
	Bio-diesel	Wittenberge	50	0	20	0	0	1999
	VNR	Ochsensfurt	50	0	20	0	0	99/00
	LUT	Rudisleben	40	0	20	0	0	99/00
	Hallerbauer/Agrana	Mainburg	5	0	4	0	0	1996
	ADIBAPV	Henningsleben	3	0	4	0	0	1997
	Voglander	Grossfriesen	2	0	2	0	0	1997
				180	205	30	0	
FRANCE 285.000	Robbel/Diester	Compiègne (Esterfp)	40	0	0	40	0	94/96
	Diester	Rouen	120	0	0	120	0	1995
	Dobre-nnova	Boussens	70	30	0	40	0	93/95
	Novacil/CI	Ver dun	60		5	55	0	
					30	0	255	0
ITALY 160.000	Bakelite	Solbiate	30	0	0	5	20	1996
	Novadi + otros	Livorno	90	0	0	20	60	1993
	Oleificio Italiani	Bari	20	0	0	0	5	1995
	Distillerie palma	Neapel	30	0	0	0	5	1995
	Focus Petroli			0	0	0	5	
	Sas +Diverse	Milano	50	0	0	10	30	1995



BIO DIESEL PRODUCTION IN EUROPE IN RELATION TO COUNTRY AND COMPANY, 2000.								
COUNTRY AND PRODUCTION	COMPANY (TECNOLOGY)	PLACE	CAPACITY SIZE	MARKET DIVISION			USED OIL	PRODUCTION STARTING
				OLEOCHEMISTRY	BIODIESEL	MIXTURE2/3/30%		
BELGIUM 85.000	Sas	Feluy	80	0			20	1995
	Oleifna	Envelde	30	30			0	
FINLAND			0	0	0	0	0	?
NORWAY			0	0	0	0	0	?
GREAT BRITAIN 2.000	United oil seeds / Cargill	Liverpool, Hull	2	0	2	0	0	1996
AUSTRIA 20.000	RME Bruck	Bruck	15	0	15	0	0	1994
	STEEG + otros	Mureck	5	0			0	90/94
SPAIN		Biocat		0	0	0	0	1998
SWEDEN 6.000	Ecobransele	Skive	6	0			0	1992
	Others		5	0	2	1	0	1996
CZECH REPUBLIC 32.000	Milo Olomouc	Olmutz	30	0			0	1995
	Others		17	0	0	14	0	92/94
HUNGARY		Babolna	0	0			0	1995
TOTAL CAPACITY			1,270,000	240	245	390	145	

Source: Biodiesel Processing Technologies and Future Market Development. Germany, 2000.



Thanks !

