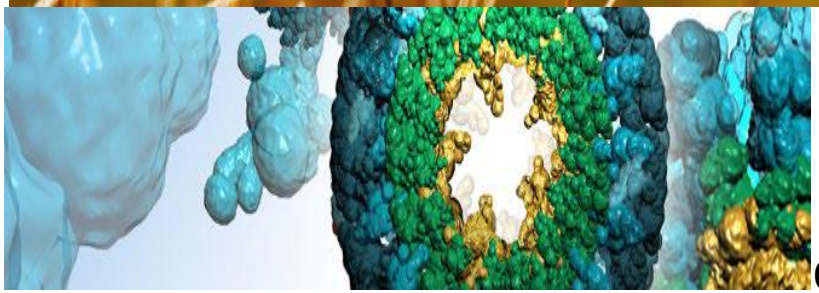
TRANS BioDiesel Ltd.

June 2018

Commercial Enzymatic Production of Biodiesel



UTILIZING TRANSBIODIESEL'S **ENZYMATIC**
GAME-CHANGING
TECHNOLOGY TO YOUR PROFIT

OUR **ENZYMATIC TECHNOLOGY** IS SETTING THE
BIODIESEL FUEL
INDUSTRY BACK ON TRACK

Conventional Chemical Production of Biodiesel –

TRANS BioDiesel Ltd.

1st generation - virgin oil (Rapeseed, Canola, Soybean) – EXPENSIVE ! Fuel Vs Feed

TransBiodiesel - Enzymatic Production of Biodiesel –

2nd generation – Waste cooking oils, Brown Grease, Animal Fat, Soapstock etc.

Brown Grease

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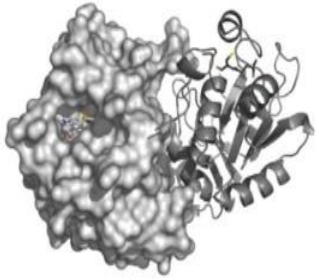
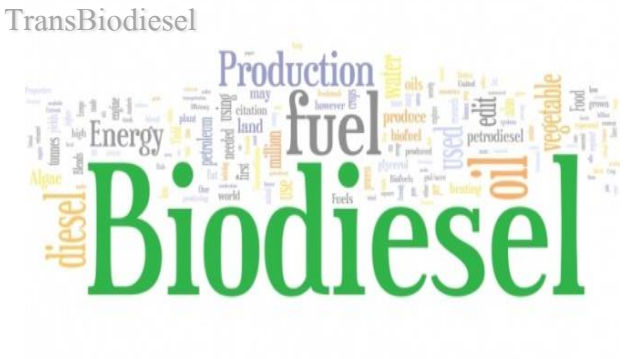
Used Cooking Oil



Enzyme



TRANS BioDiesel Ltd.

Vision

Creating a Cleaner & Safer Environment

Mission

Waste to Energy (Wealth) - Converting 2nd Generation Feed stocks to BD

Core Competency

- **Feedstock: Low price & abundant 2nd generation feedstocks**
- **Production: Enzymatic process integrated with pre- and post-treatment processes**
- **Product quality: EN and ASTM specs for biodiesel**

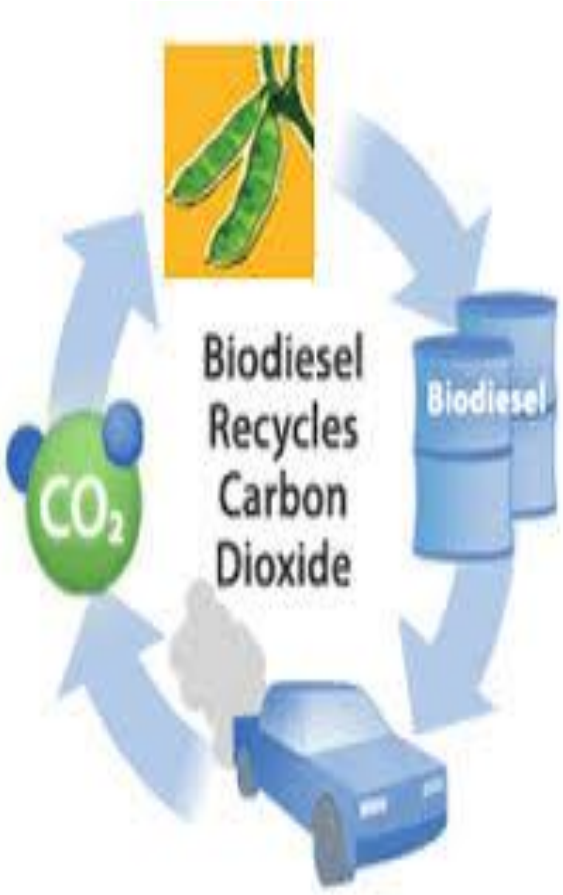
Pollution free world

TRANS BioDiesel Ltd.

Problems:
Limited amount of " Fossil" fuel

Diesel is polluting (particulates gases)

Emissions from biodiesel compared to conventional petroleum-derived diesel *.



Emission type	Biodiesel B100	Biodiesel B20
Carbon monoxide	-48 %	-12%
Hydrocarbons	-67%	-20%
Particulates	-47%	-12%
Nitrogen oxides (NOx's)	+10%	+2%
Carcinogens (PAH)	-80%	-13%
Sulfates	-100%	-20%
Ozone	-50%	-10%
Mutagens	-80%	-20%
Carbon dioxide	-78.3%	-15.7%

***Source: National Renewable Energy Laboratory (NREL), Golden, Colorado.**

TBD's PATENTED ENZYME TECHNOLOGY

Chemical method has a **high production Cost,** use of a **dry chemical** catalyst & **1st Gen expensive oil**. The Process **is energy intensive**, & **harmful** to the environment with high carbon footprint.

TBD has introduced an Important technical breakthrough, an inexpensive **Green ENZYME** which provides most efficient solution to the biodiesel industry.

.

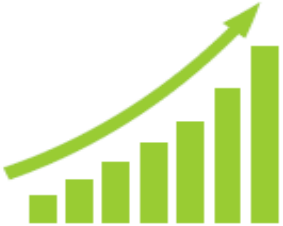
The industry is looking for an alternative greener, safer & less expensive process

ECONOMIC SUSTAINABILITY

- ENZYME REUSABILITY
- PROFITABILITY
- EFFICIENCY & PRODUCTIVITY
- EASE OF USE & SAFE
- HIGHER GLYCERIN QUALITY

ENVIRONMENTAL

- WASTE TO WEALTH
- PROVEN GREEN TECH
- ENERGY EFFICIENT
- LESS WASTEWATER
- GREEN BIOFUEL



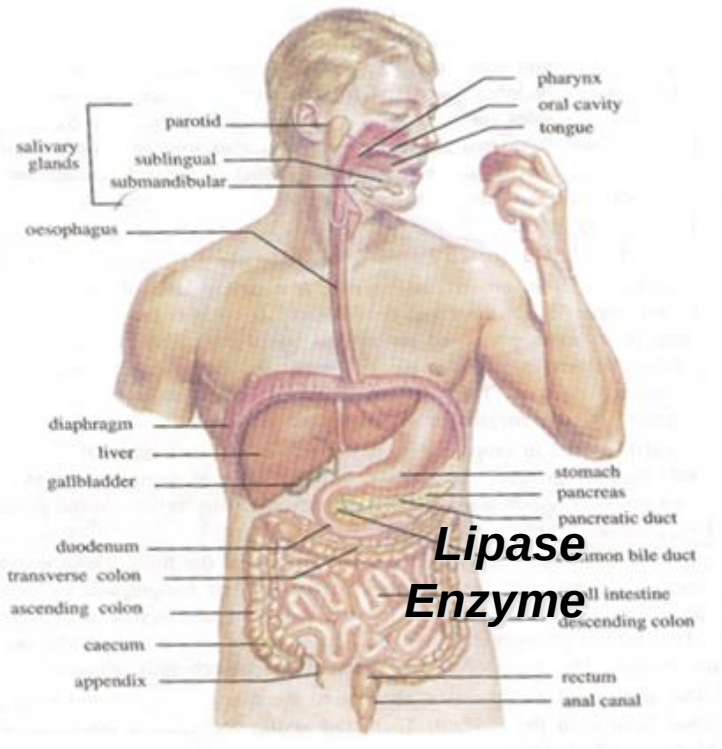
FINANCIAL

- LOWER PRODUCTION COSTS
- 1 KG ENZYME GIVES 3000 KG BD
- 3-5 CENTS PER 1 KG BIODIESEL
- $150 PER 1 KG TRANSZYME A
- HIGH PROFIT MARGIN PER TON

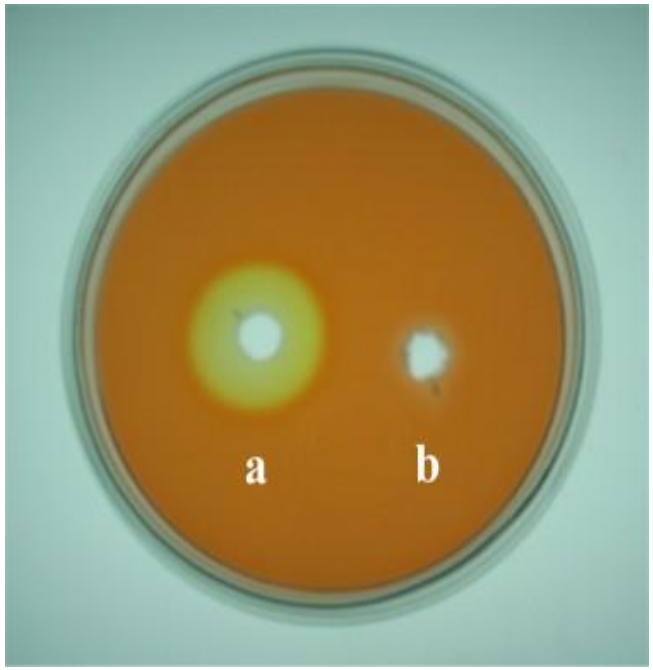
The Technology

TRANS BioDiesel Ltd.

Introducing a GAME-CHANGING, Environmentally -benign, and Cost-effective "Green Enzyme" Technology



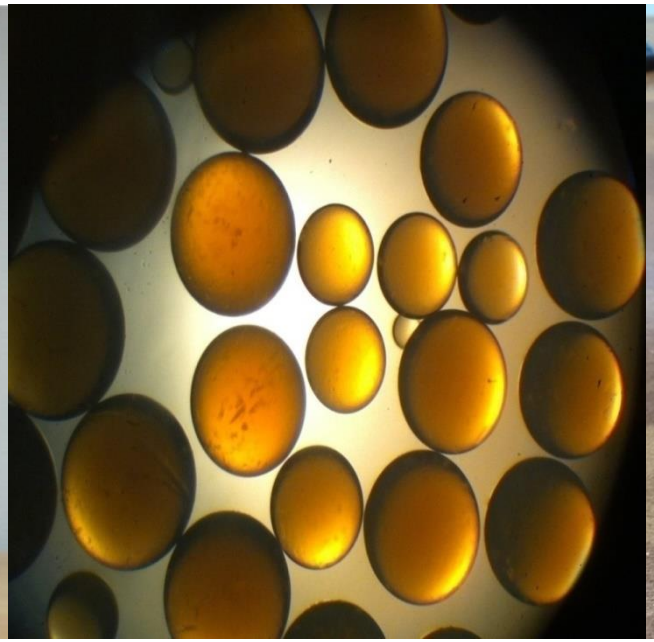
Lipase Enzyme



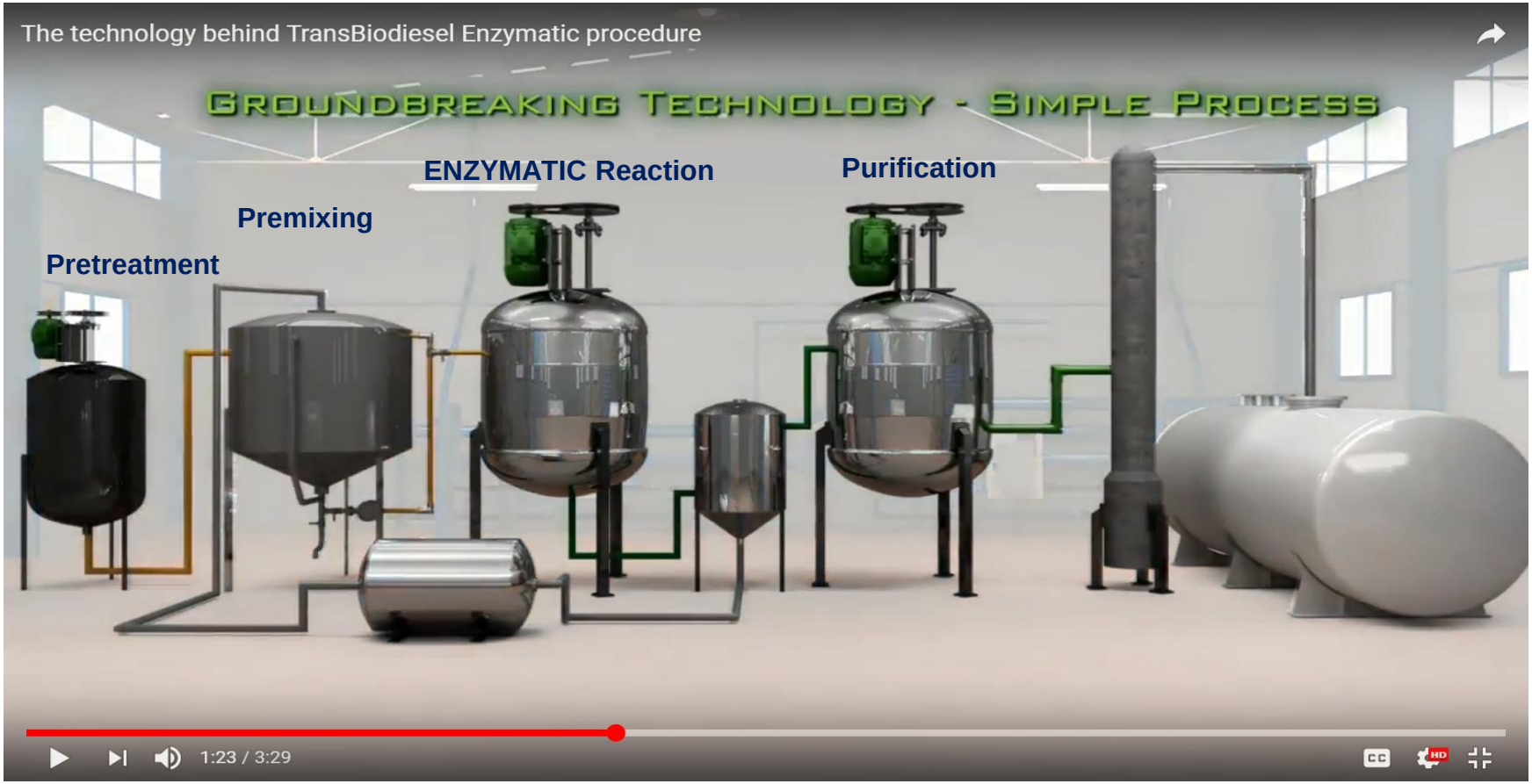
Lipase from Yeast

TransBiodiesel's Enzymes

CHEMICAL **ENZMATIC** ENZYMES ENZYMES



TRANSBIODIESEL'S ENZYME-BASED PROCESS



Rethinking the Future in Biodiesel

TRANS BioDiesel Ltd.

Technology- ➡

Triple Green Technology

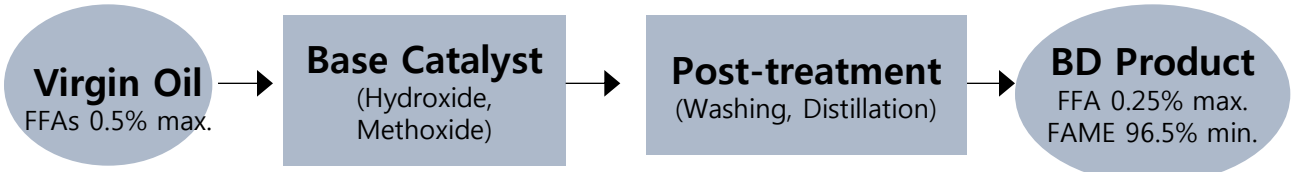
Waste Oil ⇒ **From waste water treatment**

Enzyme ⇒ **Natural & biodegradable**

Alcohol ⇒ **Bioethanol is natural**

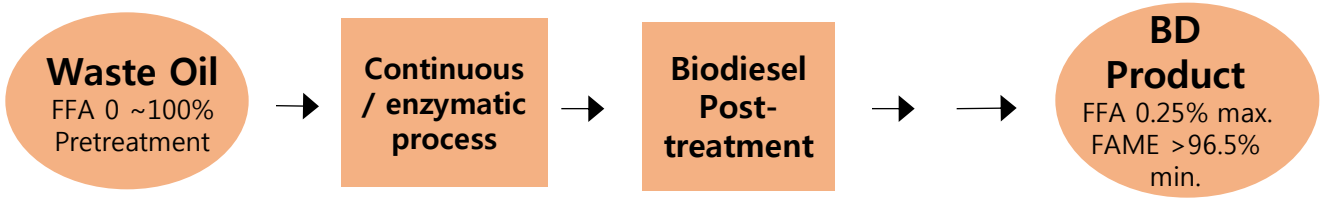
COMPARISON FOR PRODUCTION and COSTS OF BIODIESEL

● First Generation Feedstocks



[Transesterification]

● Second Generation Feedstocks



● Comparison of production costs

Unit : USD/MT

	Raw Material Cost	Sub Material Cost	Processing Cost	Total Cost	Product Cost	Average Profit
Virgin Oil/Chemical	750~850	10	130	890-990	950	~20
UCO (FFA 2.5% max.)/Chemical	650-750	75	120	845-945	950	~50
2nd Generation Oil/Enzymatic	150~450	100	150	600-650	950	~300

TransBiodiesel's Intellectual Property

No.	Region	Patent	Patent No.	Date	Note
1.	US, Europe, CA, Asia	Immobilized interfacial enzymes of improved and stabilized activity	8,551,743	31..12.2007	
2.	US, Europe, CA, Asia	Modified-immobilized enzymes of high tolerance of hydrophilic substrates in organic media	9,068,175	7.5.2008	
3.	US, Europe, CA, Asia	A robust Multi-enzyme preparation for the synthesis of fatty acid alkyl esters	8,617,866	13.11.2008	
4.	Europe, Au, CA, Asia	A process for the enzymatic synthesis of fatty acid alkyl esters	11706030.1	2.2.2011	
5.	Europe, Au, CA, Asia	A process for the enzymatic synthesis of fatty acid alkyl esters	11764620.08	31.8.2011	
6.	AU, Br, CA	Enzymatic Transesterification/Esterification Processing Systems and Processes Employing Lipases Immobilized On Hydrophobic Resins	102013033923.7	30.12.2013	
7.	Pending	Enzymatic enrichment of n-3 fatty acids in the form of glycerides			

Economics

Commercial Enzymatic Production of Biodiesel

	$/yr	$/Ton-BD
Revenue	$47,330,685	$947
Costs		
Feedstock	$18,212,961	$365
Conversion	$11,662,555	$233
Labor	$1,056,240	$21
Overhead	$1,322,137	$26
rent	$200,000	$4
Total Costs	$32,453,893	$650
EBITDA	$14,876,792	$298

This is an estimated P&L for a 50,000 Ton/year plant. It is general and can change from one country to another. As you see, the key is to find cheep waste oil feedstock such as Brown Grease (oil collected from grease traps and Fat Oil and Grease (FOG) from waste water purification centers) and UCO (Used Cooking Oil). Methanol also has a major effect on the conversion costs, therefore the cost of Methanol will significantly affect the bottom line.

Plant construction is about $15,000,000
Working capital needed is about $4,500,000.

TRANSBIODIESEL'S FLAGSHIP **TRANSZYME A**

AN IMMOBILIZED ENZYME-BASED TECHNOLOGICAL BREAKTHROUGH

WASTE RAW MATERIAL

Triple Green Technology

GREEN PROCESS

TRANSBIODIESEL'S ENZYMATIC TECHNOLOGY

THE ONLY IMMOBILIZED ENZYMATIC TECHNOLOGY TO BIODIESEL

HIGHEST QUALITY END PRODUCTS

SPEC-GRADE
EN AND ASTM BIODIESEL

MARKET FORECAST – 1st & 2nd GENERATION BIODIESEL

AREA	AVERAGE PRODUCTION (M Lit/year) **2008 - 2010** (E)	AVERAGE PRODUCTION (M Lit/year) **2020** (P)	GROWTH
NORTH AMERICA	1,894	4,596	40%
WESTERN EUROPE	9,184 0	17,610 (1st generation) 2,190 (2nd generation)	92%
LATIN AMERICA	3,602	7,268	100%
ASIA & PACIFIC	2,125	7,555	255%
OCEANIA DEVELOPED	627	719	5%
SUB SAHARAN, AFRICA	158	241	50%
OTHER DEVELOPED COUNTRIES	57	100	75%
TOTAL:	**17,647**	**40,279**	**128%**

BUSINESS PARTNERSHIP

Lets find a 

formula to our collaboration

Thank you

Let us “together” add more value

GREEN TECH

TRANS BioDiesel Ltd.

Join us Turning Waste to Biofuel

Tell the world –

- **We are going Green, Creating & Growing Environmentally Friendly Infrastructure**
- **Giving Solutions to Waste with Green Enzymatic Process (Reducing GHG).**
- **Making Biofuel from Sustainable Resources (Fighting Global Warming).**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