

Biodiesel by the Cold Process

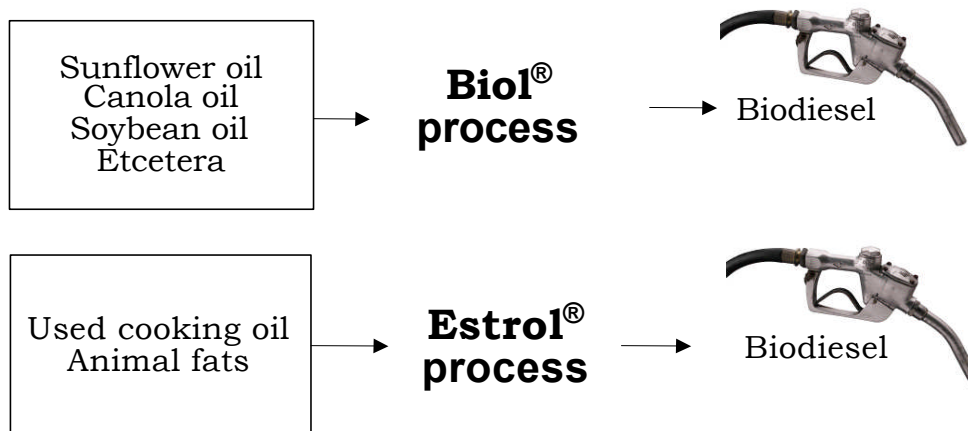
Biol[®] and Estrol[®]

Introduction

The cold process is a Swedish invention made by Carl-Johan Lindquist. It has several benefits compared to traditional biodiesel technologies. This document will shortly describe the cold process, its advantages and give you information about the inventor and the business case.

Advantages with the cold process

The cold process esterification doesn't require energy in the production of the biodiesel. Obviously this is favorable from an environmental perspective and it also grant the producer economic advantages.



The cold process is simple and scalable. This provides the biodiesel producer the flexibility to build both small and big plants suitable for local demands. For instance it is easy to build a mobile plant on a truck. The cold process can be run more or less unattended due to its simple production model.

The cold process delivers a stable and high quality biodiesel product that can be used solely or in any mixture with regular diesel. The easiness of the cold process offers the producer a quick return of investments.

Summarize of the advantages:

Scalability

- Simple process
- Uncomplicated equipments
- Divide the process and put units at different logistics locations

Safety

- No heating required with minimizing the risk of explosion and fire
- Process run at atmospheric pressure
- No critical timelines in the production phase

Quality

- No byproducts like soap in the end product
- Can be used solely or in any mixture with regular diesel

Image

- The Cold Process gives a stronger environmental profile due to no heating

in the production
Profitability

- Small investment-, run- and employees cost
- No supply of energy in the transesterification
- Scaleable process

Advantages to own the Cold Process:

- Branding: Opportunity to cooperate with large cooking oil users like McDonald's, Frito lay etcetera
- Ability to produce at full margin
- Keep back competitors
- Goodwill: Swedish innovation with strong positive environmental profile

Example: Plant investment with a production of 600,000 gallon/year.

Industrial parts	plant	
	300,000 USD	
Write off (10 years, 4%)	36,000 USD	
	ESTROL®	BIOL®
USD/gallon	Cooking oil	Soybean oil
Basic cost	0.06	0.06
Work	0.12	0.12
Chemicals	0.26	0.23
Raw material	0.00	1.80 ^a
Glycerine for sale	-x.xx	-x.xx
VAT & License	+y.yy	+y.yy
Total cost: USD/gallon	0.44	2.2^b

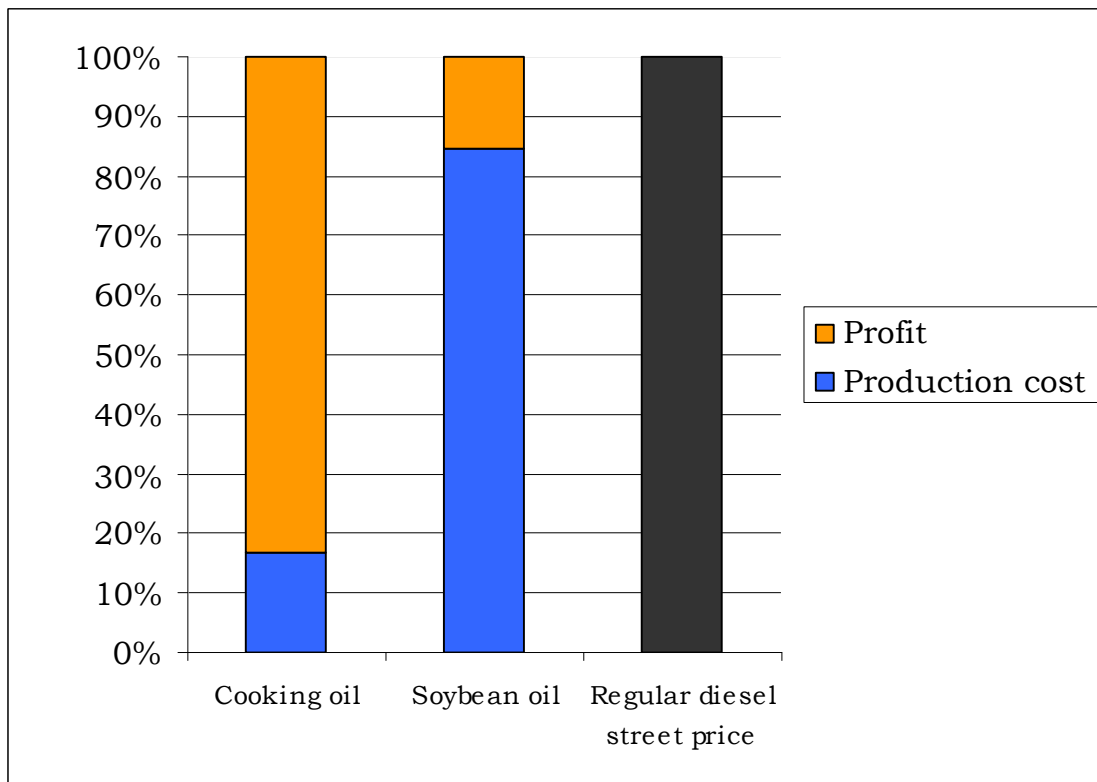
a: Economic Reserch Service, USDA, Oil World, 2006.

b: Energy Information Administration, Retail Price: 2.61 \$/Gallon, December 2006.

Conclusion - To convert waste, as used cooking oil or vegetable oils and animal fats into Carbon Dioxide free diesel fuel by the Cold Process (Estrol®), provide the owner strong revenues. The Estrol® process is environmental friendly, scalable, not time dependent, especially adapted to a variety of raw materials and easy to handle.

The Biol® process provides a positive return. Compared to regular diesel the revenue is depending on the raw material price. But there will be (or are) demands for using biodiesel when applicable. This guarantees a higher price for the biodiesel and will give advantages for the retailer selling environmental friendly diesel.

The Estrol® and Biol® process have low productions costs and this will be of crucial importance in the long run.



Business case

Carl-Johan Lindquist is today a senior citizen and will turn 70 this year. His background is from development, research and he has worked as a teacher. With the lack of business experience and considering his age, Carl-Johan has decided to trade of his invention, either as a complete sale of the technology or with a license agreement. Of course Carl-Johan will value the buyer's ability to take the cold process to the market.

Cold Process Background

The first innovative step with the cold process was taken in 1985 to transesterificate vegetable oil into environmental friendly biodiesel fuel. In 1991 the new technique was ready to be tested in a real plant at an Agriculture College in Sweden. The pilot plant was built under simple circumstances with milk tanks. The plant produced 1,000 gallon/year. Later the milk tanks were exchanged with proper reaction tanks to meet the FAME quality. This new plant was able to produce an amount of 45,000 gallon biodiesel per year.

Over the years the Cold Process Biodiesel technique has been improved by Carl-Johan Lindquist and today it also produce biodiesel from animal fats and waste like used cooking oil (Estrol®).

About the inventor



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Degrees:

Tele Engineer

MS Technology

20p Data Technology: The University of Uppsala

20p Pulse Technology: The Royal Institute of Technology in Stockholm

40p Chemistry: The University of Uppsala

105p Physics: The University of Uppsala

Positions:

Development Engineer, Military Electronics: Ericsson

Radiation Physicist: University Hospital of Örebro

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Business issues



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In this business process Carl-Johan Lindquist has engaged his son Henrik Ripa. Henriks background is from sales and marketing. Henrik works at the procurement company HBV as Regional Manager. Prior to this employment with HBV, Henrik founded and build a software retail chain in Sweden. Before that Henrik spent five years at the Scandinavian IT distributor Scribona as Key Account Manager. Henrik began his career with different programming projects.

Reference

The plant was built at the Agriculture College, Kvinnerstaskolan, Axberg, S-705 91 Örebro, Sweden. www.kvinnersta.orebro.se

The cold process and vehicles were tested during 1991 – 1994 at the College.

Ulf Skoog was responsible for the work at the College.

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