Lessons Learned: Lab to Market

QTEROS

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TIMBR
The Institute for Massachusetts Biofuels Research

Mission:

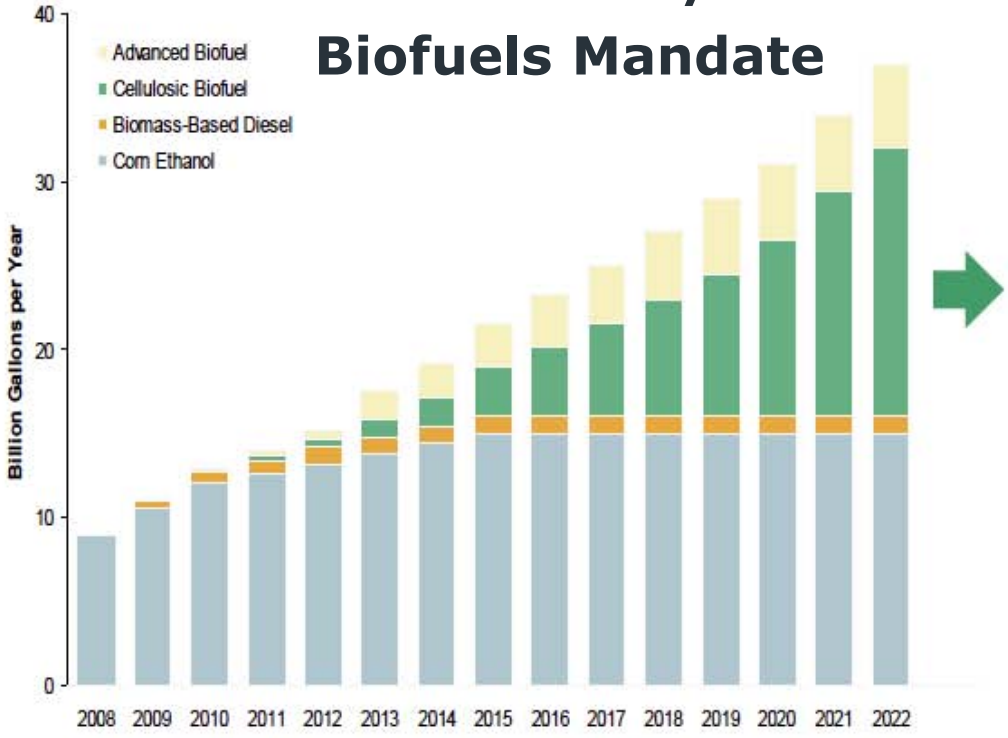
- *Develop industry-standard platform for lowest-cost cellulosic ethanol production*
- *Catalyze & accelerate worldwide commercialization of advanced biofuels*

Why Cellulosic Ethanol?

- Fossil fuel combustion → global warming →
  Limit greenhouse gas emissions
- National security concerns →
  Limit our dependence on foreign oil
- Economy → Green Economy → Jobs
- The only form of renewable energy that can contribute substantially to meeting transportation fuel needs at costs competitive with fossil fuel is solar energy captured by photosynthesis and stored in biomass.

Why Cellulosic Ethanol?

US 2007 EISA/RFS2 Biofuels Mandate



Corn ethanol already represents an existing and well-developed, multi-billion dollar market

	Cellulosic Biofuels (Billion Gallons / Year)		New Plants / Year (30MM gal/yr)	
2010	0.10	0.0065*	3	0
2011	0.25		5	
2012	0.50		8	
2013	1.00		17	
2014	1.75		25	
2015	3.00		42	
2016	4.25		42	
2017	5.50		42	
2018	7.00		50	
2019	8.50		50	
2020	10.50		67	
2021	13.50		100	
2022	16.00		83	
			534	

Cellulosic ethanol can be immediately integrated into the existing ethanol infrastructure

***EPA adjustment of RFS2 for 2010**

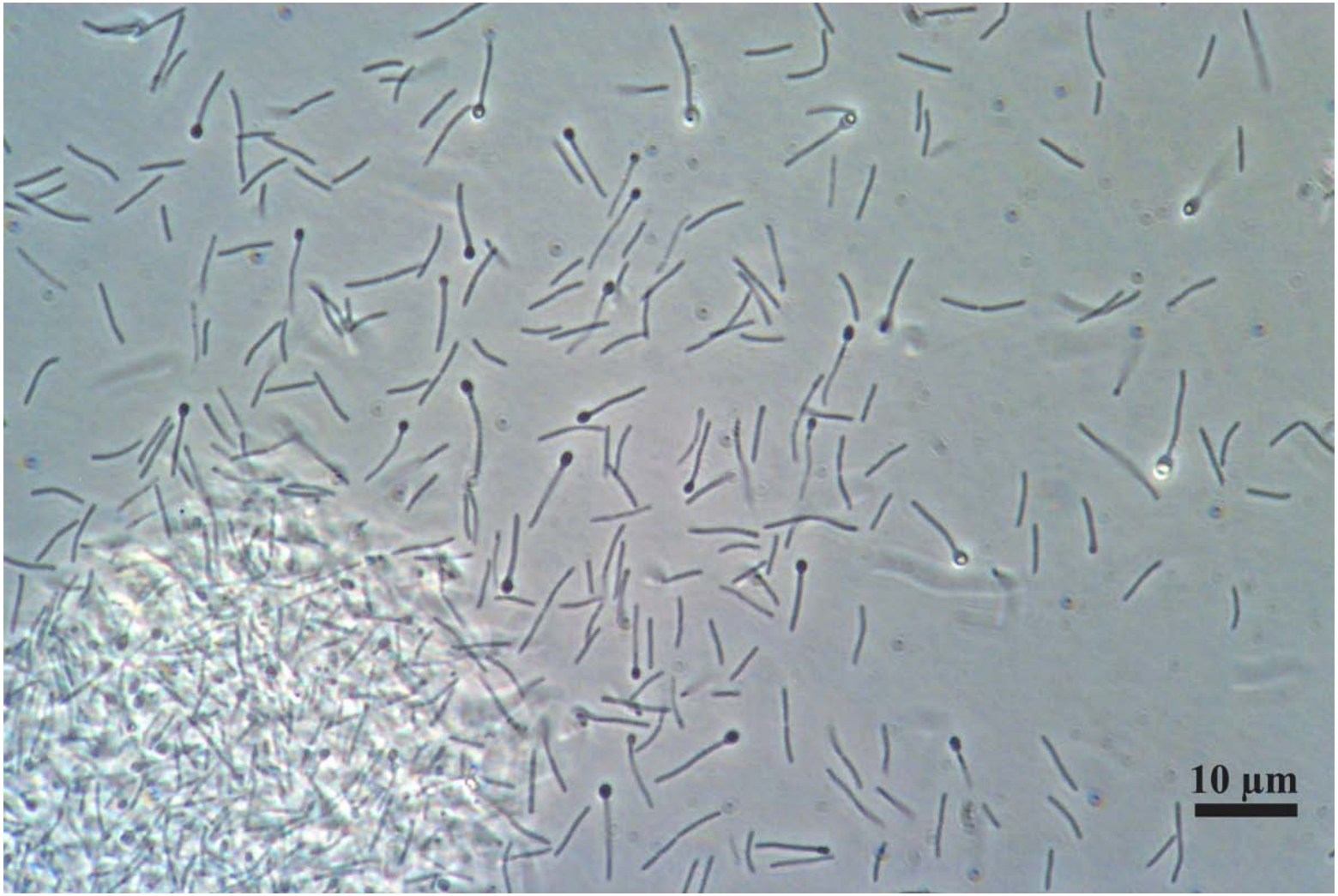
Why Cellulosic Ethanol?

- Fossil fuel combustion → global warming →
  Limit greenhouse gas emissions
- National security concerns →
  Limit our dependence on for
- Economy → Green Econor

Key Impediment!

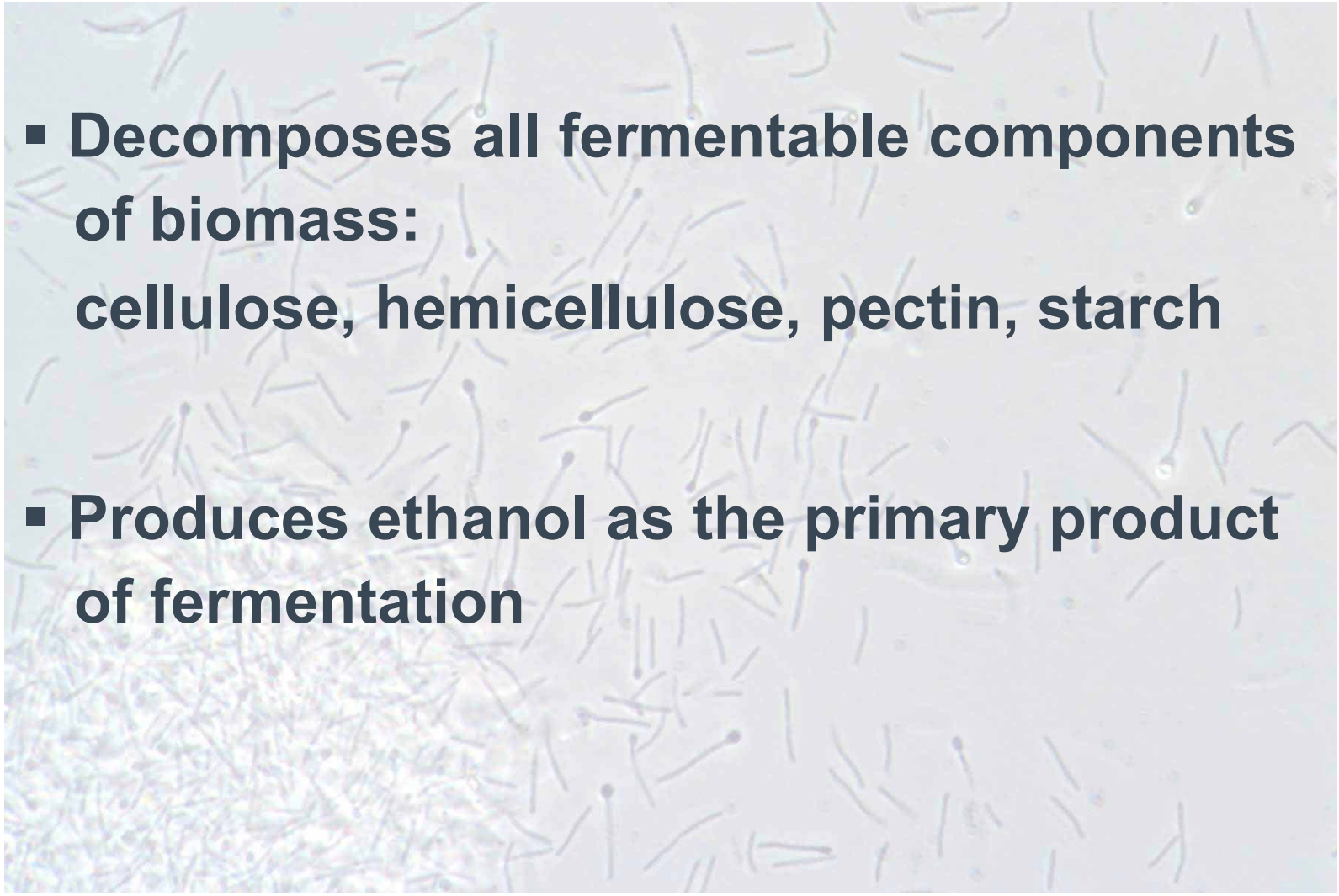
- The only form of renewable energy that can contribute substantially to meeting transportation fuel needs at costs competitive with fossil fuel is solar energy captured by photosynthesis and stored in biomass.

A novel microbe from soil ➔ converts non-food plant residue to biofuel ➔ cellulosic ethanol



Clostridium phytofermentans ~ Q Microbe™

A novel microbe from soil ➔ converts non-food plant residue to biofuel ➔ cellulosic ethanol



- **Decomposes all fermentable components of biomass:**
  cellulose, hemicellulose, pectin, starch

- **Produces ethanol as the primary product of fermentation**

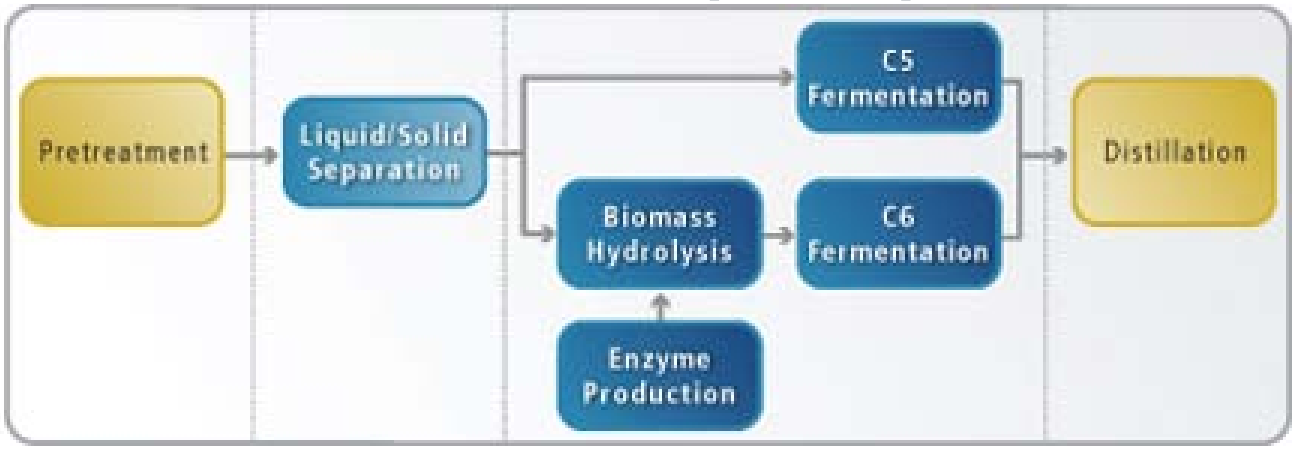
Clostridium phytofermentans ~ Q Microbe™

Uncommon properties of *Q Microbe* enable Consolidated BioProcessing technology

Qteros' single-step CBP process

Compare to:

Traditional multi-step CBP process



A novel microbe from soil ➔ converts non-food plant residue to biofuel ➔ “cellulosic ethanol”

"Systems and Methods for Producing Biofuels and Related Materials"

U.S. Patent No. 7,682,811

Technology developed & disclosed - Summer 2005

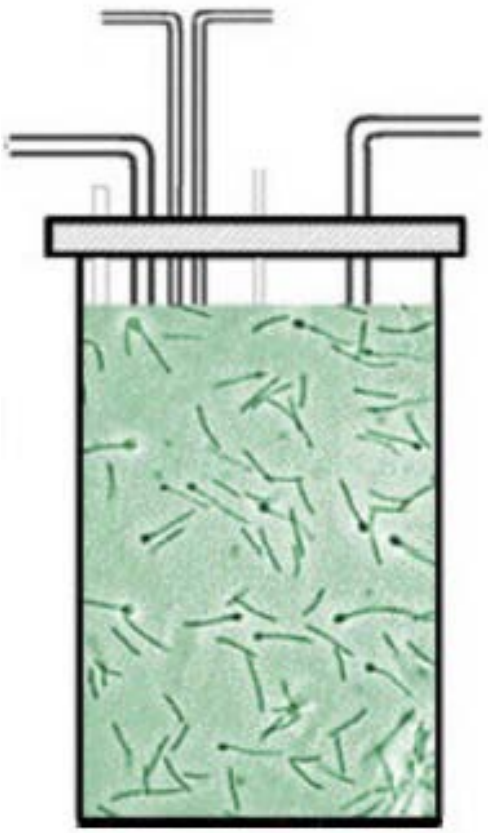
Provisional filed - January 2006

Application filed - January 2007

Patent issued - March 2010

Clostridium phytofermentans ~ Q Microbe™

SunEthanol, Inc.



- Founded: November 2006
- Headquartered in Amherst & Hadley, MA
- Scale-up & improve the ***Q-Microbe***™ technology for cellulosic ethanol production

~~SunEthanol, Inc.~~

QTEROS

- Name changed to Qteros: November 2008

Qteros Headquarters
Marlborough,MA

QTEROS

- Converts industrial feedstocks to ethanol
  - Corn stover, corn fiber, switchgrass, sugarcane bagasse
- Ethanol outputs:
  >10 grams per liter per day in a single-step process

Qteros Headquarters
Marlborough,MA

Lessons Learned: Lab to Market

How does an academic microbiologist start a company when she knows NOTHING about business?!

Lessons Learned: Lab to Market

Jattra Ventures

Jattra Team:

John Fabel
Jeff Hausthor
Steve Rogers
Jef Sharp