



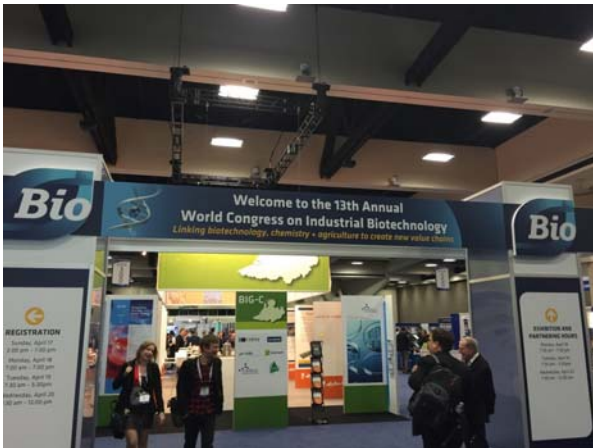
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## Replacing Petro-chemicals With Bio-Based Alternatives. Can We Do It?



Entrance to the trade show portion of the meeting in San Diego this week

Getting away from dependence on fossil fuels is an attractive idea, but can it be done? I got some very interesting perspective on that question while attending the [2016 BIO World Congress On Industrial Biotechnology](#) this week here in San Diego. I came away quite encouraged and highly impressed with the pace of innovation. This is particularly true for products we get from oil today, such as plastics, paints and coatings, textiles, as well as some antibiotics, flavors and fragrances. This shift will certainly not happen overnight, but it is something that is progressing, driven by rational economics and rapidly evolving science.

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\*Based on an average of sound ratings of 24" Full Size Stainless Steel Tub dishwashers contained in major brands' websites. Major brands defined as TraCline Top 5 Market Share December 2015.

Although its hard to imagine in a time of record low crude oil and natural gas prices, someday fossil fuels will be depleted. Long before that, a reduction of greenhouse gas emissions is desirable. One logical strategy is to find ways to supply our chemical and fuel needs from renewable sources like trees, algae, crops and currently under-utilized waste-streams. This is what this Bio meeting was all about. There were over 1000 attendees from 50 countries representing large and small companies, universities, associations and government entities. There were often as many as 8 sessions going on at once, so I can only report some of the high level themes from this gathering. I hope to do some additional posts about some specific and inspiring innovation stories I heard from individuals I interviewed.

Overall, what I witnessed this week was an encouraging nexus of world-class science, appropriate attention to safety, and ethical/practical capitalism – all combined with sincere idealism and can-do optimism.



*Dr Craig Venter of human genome project fame accepting the [George Washington Carver](#) Award at this meeting*

Some of the highlights and take-away perspectives:

1. This effort is truly international with centers of excellence all around the globe
2. Recently there have been enormous advances in genetic engineering and DNA synthesis and sequencing. As a result, the research phase isn't limiting for many ideas
3. This isn't just about biotechnology, there are pure chemistry approaches which are good fits for some of the goals
4. There is more near-term promise in areas other than transportation fuels as those have been most impacted by low oil prices and are sometimes complicated by food/fuel trade-offs
5. Companies that use these chemicals won't necessarily pay more for a bio-based material, but if there are functional advantages even a slightly more expensive bio-material can replace a petro-chemical. In some cases, the bio-based material can even end up being cheaper
6. The starting materials or "feed-stocks" range from corn to wood to algae to municipal solid waste, to used cooking oil, to by-products from food and biofuel processing. Methane (natural gas) can also be a useful starting material.
7. It usually makes the most sense to "piggyback" on existing systems for the production and collection of feed-stocks rather than try to develop whole new systems
8. Some government policies (tax laws, quotas, blending requirements...) have encouraged this industry, but often they have caused disruptions, distortions, or trade anomalies which have not been truly helpful
9. After years of effort, algae-based systems of various types are becoming more practical, not maybe so much for biofuels, but for higher value chemicals and animal feeds
10. The global regulatory regime for bio-industrial technology is not without uncertainty or lack of international harmonization, but on the whole it is more rational, timely and predictable than that for "GMO crops."

I would like to hear the perspective from others who attended this meeting, but overall, I came away encouraged about our chances of making some major shifts towards bio-based materials.

Steve Savage – you are invited to comment here and/or to send me an email

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