



The Impact of Technology on the Botanicals Marketplace
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The Impact of Technology on the Botanicals Marketplace

Sourcing & supply: where do dietary ingredients come from?

- Wild harvest
- Cultivation: soil, aquaponics, hydroponics,
- Synthetic: organic chemistry, synthetic biology,
- Other: cell culture, ...

Quality, specs, & marketing: Is a material synthetic or natural?

- Testing
- Transparency

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Fighting for the Future of Botanicals

Identifying New GMOs Sneaking into your Products

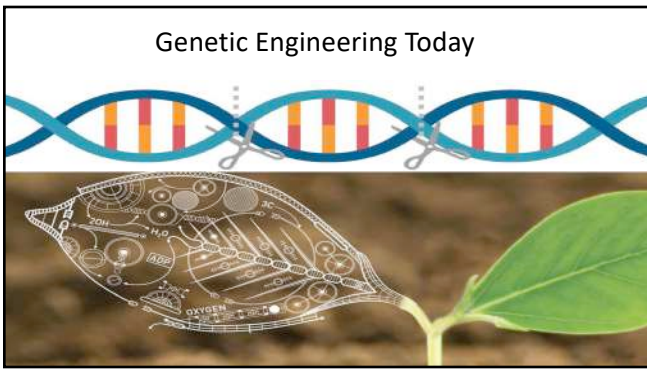


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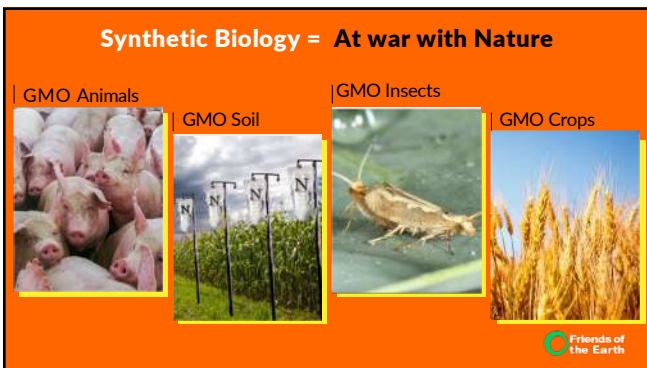
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**Repeat Promises,
Myths, and Risks:**



- Contamination?
- Health Impacts?
- Defective?
- No transparency.



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**Regulatory Loopholes
Little Consumer Choice**



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Lab Engineered Animal Proteins



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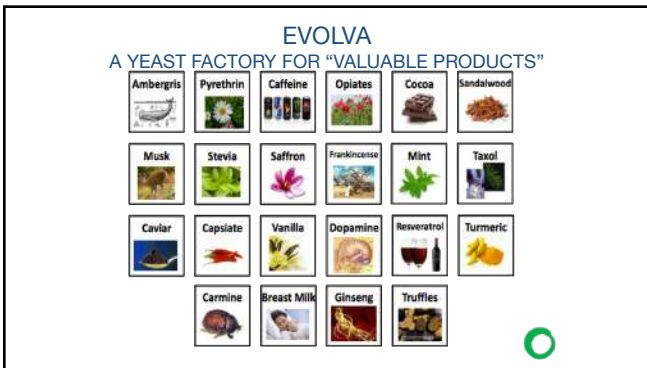
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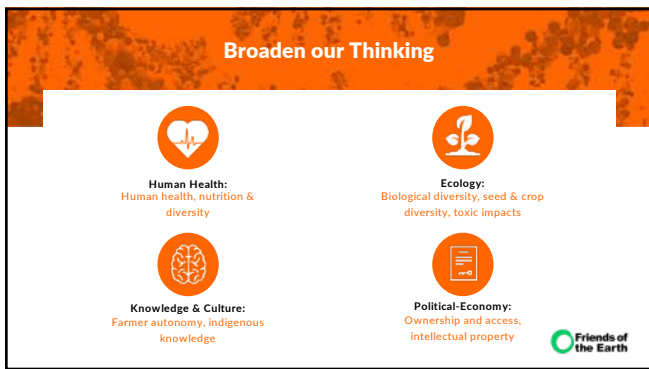
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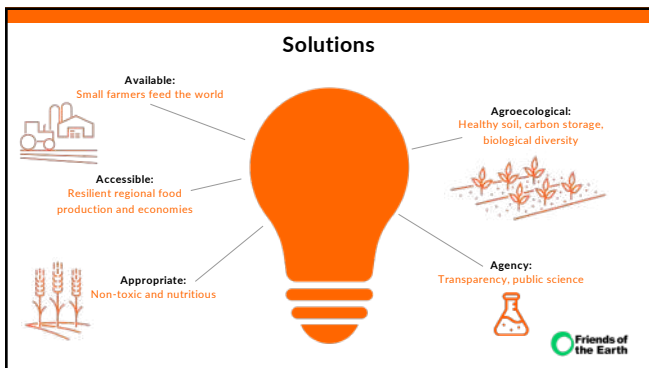
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**Reimagining Botanicals:
Mastering the Market**

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**The Impact of Technology on the
Botanicals Marketplace**


The New World of EB

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The Lexicon

- EB – Engineering Biology
- The Convergence – The Third Revolution
 - The life sciences (genetics)
 - Information sciences (artificial intelligence)
 - Engineering (3D manufacturing)
- EO – [Executive Order](#) on Advancing Biotechnology and Biomanufacturing Innovation for a Sustainable, Safe and Secure American Bioeconomy – September 12, 2022

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Executive Order on Advancing Biotechnology and Biomanufacturing Innovation for a Sustainable, Safe, and Secure American Bioeconomy

By the authority vested in me as President by the Constitution and the laws of the United States of America, it is hereby ordered as follows:


Section 1. Policy. It is the policy of my Administration to coordinate a whole-of-government approach to advance biotechnology and biomanufacturing across executive departments to enable, through design, energy, health, security, agriculture, supply chain resilience, and national and economic security, innovation for the public and for our nation, and principles of equity, ethics, safety, and security, that enable access to biotechnology products and production systems that benefit all Americans and the global community, and that maximize impact from technological knowledge and innovation.

Biotechnology represents the power of biology to create new vehicles and products, which provide opportunities to grow the national economy and workforce and increase the quality of our lives and the environment. The

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- NBBI – National Biotechnology and Biomanufacturing Initiative
- mRNA – Messenger RNA
- GenZ+ – 1995 and younger (or, anyone born right after DSHEA & beyond)
- TFITR – The Fork In The Road

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Origins of the Third Revolution

- 1) The Accelerant – COVID-19
- 2) The Convergence – engineering biology
- 3) The EO – the new bio-economy
- 4) GenZ as the future consumer and the future leadership of our industry

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Loren...
What are you talking about?

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Here's the point:

- The Third Revolution is here.
 - COVID-19 was the trigger to battle test mRNA technology in the form of COVID-19 vaccines.
 - It has long been a dream to harness the power of mRNA, which happened, but to what effect?

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- The promise of the Convergence was revealed in the Executive Order, which defines a future world based on ***“using biotechnology and biomanufacturing for food and agriculture innovation, including by improving sustainability and land conservation; increasing food quality and nutrition; increasing and protecting agricultural yields; protecting against plant and animal pests and diseases; and cultivating alternative food sources.”***
- This is the directive to the Secretary of Agriculture.

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- Well, that sounds great. The problem is, that's our message, and yet the means to such goals could not be more different.
- A new engineering biology arms race has begun. The Executive Order is designed to assure U.S. leadership and dominance in the EB world.

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- Who will be attracted to this EB message?
- GenZs born mid-1990s, who are digital natives and the most likely to embrace the promises and opportunities of the EB economy – promising the chance to participate in pioneering work, meaningful innovation, monetary rewards and professional distinction.

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- We now see within our industry the bright, young and successful entrepreneurs who are using the tools of technology, social media, digital communication, even artificial intelligence, to bring new brands and ideas to market. They appear to be well received, often acquired by large CPGs or VCs. They are also rewarded for their innovation through awards and recognition in the industry.

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My Point:

- The natural product industry's vision of a better world has been co-opted by the emerging EB revolution:
 - Sustainability
 - Land conservation
 - Food quality
 - Protecting agricultural yields
 - Cultivating alternative food sources
 - Minimizing the impact of climate change
 - Reducing greenhouse gas emissions
 - etc., etc...


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An Example:


- Synthetic botanicals (SynBots)
 - Not currently permitted by FDA as a dietary ingredient
 - But, under the NBBI, would FDA reconsider its position in view of the new federal mandate (EO) to develop SynBio?

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My Suggestion:


- The Millennials and GenZs (like it or not) are the critical group we must speak to clearly and directly and distinguish between the vision and benefits of the natural product world and the engineering biology world which, in their minds, are simply a different means to the same end.

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Your Homework Assignment:


- 1) Understand the lexicon of the EB Convergence.
- 2) Thus enabling us to speak to the Millennial/GenZ community with informed language and perspective.
- 3) This is where the TFITR comes in. We are truly at a fork in the road, and we must clarify and unify our vision, our message, and opportunities to participate and lead the way to a better world through principles of respect for the planet, its people, its resources and wisdom.

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Thank you

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