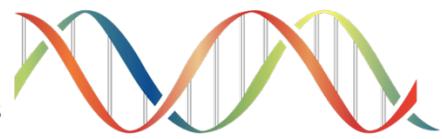


Community BioRefineries
The Epitome of American Innovation



From Waste to Wealth: CBR's Sugar Beet Bioeconomy Breakthrough

By Scott Hewitt CEO and Vincent R. James Ph.D. CTO
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Introduction: The Underdog's Vision in Agriculture

"Though free to think and act, we are held together, like the stars in the firmament, with ties inseparable. These ties cannot be seen, but we can feel them."

~Nikola Tesla

In the late 19th century, Nikola Tesla, an underdog against Thomas Edison's entrenched empire, envisioned a world powered by alternating current—an invisible force connecting homes and cities. While Edison's visible filaments lit up parlors, Tesla's radical ideas faced skepticism but ultimately transformed energy. Edison had the patents, investors, and public image; Tesla had only vision and persistence.

Today, the sugarbeet (*Beta vulgaris L.*) stands at a similar crossroads, its potential overshadowed by a conventional, root-centric focus on sucrose-rich roots. Much like Tesla's unseen current, the plant's overlooked leaves and residues contain transformative potential, waiting to be tapped into for food, fuel, and materials.

It is here that the Community BioRefinery (CBR) emerges. Guided by CEO and co-founder Scott Hewitt, who reminds us to *"use everything – waste nothing,"* and CTO Vincent R. James, PhD, who leads the technical execution, CBR embodies Tesla's underdog spirit in agriculture. Together, they envision a paradigm shift: whole-plant valorization that reimagines the sugar beet not as a one-note sugar crop but as a multi-output engine for nutrition, renewable energy, and rural prosperity.

Historical Context and Current Production of the Sugar Beet

The sugarbeet's rise began in the late 18th century, catalyzed by Napoleon's 1806 Continental Blockade, which cut Europe off from Caribbean cane sugar. Forced innovation birthed beet sugar, which by the mid-19th century had spread globally (Biancardi, Panella, & Lewellen, 2012). Today, sugar beets contribute 20–30% of global sugar, producing 250–280 million tons annually (European Commission, 2023).

In the United States, beets supply over half of domestic sugar—an estimated 5.18 million short tons raw value in 2025/26 (56% of supply) (USDA ERS, 2025). Minnesota and North Dakota’s Red River Valley leads with nearly half of national output, followed by Michigan, Idaho, Nebraska, and Wyoming (American Sugar Beet Growers Association, 2025).

The Scale of Underutilized Biomass

Traditional processing, focused only on sucrose extraction, discards 30–40% of the plant—leaves and tops—equivalent to 70–100 million tons globally and 25–30 million tons annually in the U.S. alone (Tenorio, Gieteling, & de Jong, 2016; USDA ERS, 2025). Most of this biomass is plowed back into soil, fed to livestock, or simply wasted.

If processed through Community BioRefinery (CBR) valorization hubs, even 25% of this currently wasted U.S. biomass could yield:

- 500,000+ metric tons of high-purity plant protein isolate (>90% RuBisCO and associated proteins);
- 400,000+ tons of nutraceutical and phytochemical extracts, including polyphenols, chlorophylls, and betaine;
- Biofuels, electricity, and bioplastics from residues, replacing millions of barrels of fossil-based inputs.

This would elevate the sugar beet from a \$20B sugar crop into a \$100B+ whole-plant economy, multiplying farmer returns and regional GDP contributions.

Nutritional and Biochemical Treasures in Beet Leaves

Sugarbeet leaves, too often treated as waste, are a biochemical powerhouse. With 15–25% protein by dry weight, they are dominated by RuBisCO, the most abundant protein on Earth. RuBisCO offers a complete amino acid profile and high digestibility, rivaling whey and surpassing pea and soy (DIAAS >100) (Tenorio et al., 2016; WUR, 2024).

Beyond protein, beet greens contain:

- **Polyphenols:** Gallic, ferulic, and caffeic acids with antioxidant and anti-inflammatory properties (Cejas et al., 2021). Global nutraceutical polyphenol market valued at \$1.5B in 2024, growing at 6.4% CAGR (Food Processing, 2024).
- **Chlorophylls:** Antioxidants with anticancer applications in photodynamic therapy (Senge et al., 2014). Global chlorophyll market ~\$430M (Taylor & Francis, 2023).
- **Betaine:** Supports cardiovascular and liver health (Craig, 2004). Betaine market projected \$4.5B by 2030 at 5.8% CAGR (T1D Exchange, 2023).
- **Minerals:** Magnesium, potassium, and iron fortification markets add billions in functional food revenues.

If even 10% of U.S. sugarbeet leaves were valorized through CBR, they could generate over \$3B annually in nutraceutical and phytochemical products, while simultaneously delivering sustainable proteins to food companies seeking alternatives to soy and pea.

Globally, pioneers like Cosun Beet in the Netherlands have begun extracting RuBisCO, but mostly at pilot scale (Cosun, 2024). The U.S. opportunity—with CBR’s patented scalable technology—remains immense and largely untapped.

Technological Breakthroughs in Community BioRefinery Valorization

CBR, like Tesla against Edison, is proving the impossible possible. Its USDA-co-patented process yields true plant protein isolates at >90% purity—far beyond pea or soy concentrates (50–70%) in taste, solubility, and nutrition (USDA, 2023; Pelgrom et al., 2015). This neutral, versatile protein targets a global plant protein market expected to grow 50% by 2050 (FAO, 2022).

CBR’s platform extends further:

- **Proteins/Nutraceuticals** from leaves;
- **Bio-Acetone** (renewable solvent) and Bio-Butanol (energy-dense fuel, precursor to Alcohol-to-Jet SAF);
- **Multi-fuel cell electricity** from bio-butanol, ethanol, hydrogen, and biomass;
- **Bioplastics** (PLA and PHA) from residues.

Unlike centralized mega-plants, CBR’s 1–2 MW hubs deploy rapidly, resist cyberattacks, and power communities—hospitals, first responders, and farmers—during crises (CBR, 2025). CTO Vincent James plays the role of Tesla’s engineer—proving what others dismissed as “impossible” can scale.

Visualizing the Shift: From Root-Centric to Whole-Plant Economy

Traditional Root-Centric Model

- Roots (Sugar): 60% (For traditional sugar processing)
- Leaves: 30% (Waste/Feed)
- Residues: 10% (Byproducts)
- **Waste: 40% underutilized**

Community BioRefinery Valorization Model

- Roots (Sugar): 60% (CBR will not redirect the current use of the sugar beet; however, CBR *is capable of using* sugars to produce significant biofuels and hydrogen)
- Leaves: 30% (Proteins/Nutraceuticals)
- Residues: 10% (Fuels/Bioplastics)
- **Waste: 0%**

Benefits:

- Farmer incomes: *Increase 15–25%* through CBR diversified outputs.
- Job creation: 1–2 jobs per 1,000 tons processed (IRENA, 2024).
- Regional growth: Red River Valley (MN/ND), Michigan, Idaho, Nebraska, Wyoming poised to lead.

American Made Advantage

Europe has piloted partial valorization (Cosun in the Netherlands, Tereos in France), but only the U.S. combines production scale with CBR's patented process. Here, CTO **Vincent James** leads deployment of U.S.-based innovations that ensure sovereignty in proteins, fuels, and biomaterials.

By leveraging domestic feedstocks, CBR reduces dependence on imported proteins and petrochemicals while revitalizing American rural economies. This positions the U.S. to lead a \$100B+ bioeconomy, powered by homegrown crops and innovation.

Conclusion: The Underdog's Triumph

Like Tesla defying Edison's dominance, CBR challenges agriculture's giants, proving that overlooked sugarbeet leaves and residues can fuel a bioeconomy. By valorizing the whole plant—roots for sugar, leaves for proteins and nutraceuticals, residues for fuels and plastics—CBR embodies Scott Hewitt's vision to “*use everything – waste nothing.*” Further, the good news is that the CBR process can accomplish the same results with virtually any crop.

For policymakers and accredited investors, the choice is clear: support the underdog that can make America a leader in food, fuel, and materials. Just as Tesla's AC current powered the 20th century, the sugarbeet, through the Community BioRefinery, can power the 21st century. Tesla's unseen current lit the world. The sugarbeet's unseen leaves and residues can do the same—if we have the foresight to back the underdog now.

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