Food vs. Fuel: Dating Your Feedstock, but Never Marrying, Part 1

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 New feedstocks are emerging not only for biofuels, but for foods as well. Recently we published a report that the chairman of Nestle, Peter Brabeck-Lemathe, has called anew for a ban on making biofuels from feedstocks that can also be used in food production. The backdrop for Brabeck's comments is the U.S. drought, which is causing sharp falls in corn yields.

Now, there are bound to be those who shrink from taking direction on how best to feed the world from the makers of Chocapic breakfast cereal, Wonka bars and Hot Pockets — who regard the Nestle message as self-serving and transparently aimed at shifting product margins.

But many others agree that food producers should have the first (or only) call on these feedstocks — a popular meme on Twitter has been "why should people go hungry, so rich men can have fuel for their cars?"

It's an intuitive concern for most Westerners, who are highly urbanized and exposed to agriculture via the grocery store. They experience the impact of rising prices in terms of their costs, not their returns on investment.

Not so for the least developed countries. There, the most exposed portion of the global population, in terms of nutrition and all the ills of extreme poverty, tend to be subsistence farmers who are driven into misery not by low U.S. crop yields, but low commodity prices.

What has driven many of them off the land and into the cities, where they are badly

exposed to U.S. grain cycles, is the poor returns from subsistence farming that low producer prices bring and by making technology improvements difficult, if not impossible, to make cost effective.

As a result — we are usually at an impasse. Agriculture points to the benefits of rising prices for key feedstocks, whereas consumers point to the pitfalls. Hence, the food vs. fuel debate.

And so the debaters debate and debate and debate. Meanwhile, entrepreneurs and scientists are giving us something even more precious than resolution of that debate, which is to say, options and alternatives.

Today, we look at six technologies and strategies that address food vs. fuel, and offer alternatives.

1.) Feedstock Diversification

In biofuels, it is more talked about — the push beyond corn starch and cane sugars into corn stover, sugarcane bagasse, woods and forestry residues, animal wastes, algae, municipal solid waste and energy grasses, as well as new inedible oilseed crops, such as jatropha, carinata and camelina.

But there are opportunities for food manufacturers as well.

Take, for instance, Solazyme Roquette Nutritional's whole algalin flour. According to the makers, it provides "an outstanding solution for improving nutritional profiles in many applications, such as bakery, beverages and frozen desserts. Acting as a whole food ingredient, whole algalin flour is very low in saturated fat, trans-fat free, cholesterol free and reduced calorie, as well as provides fiber and protein, while offering the same overall mouth-feel and consistency as a full fat food."

Much of the underlying problem of food vs. fuel is that multiple sectors have fallen in love with the same feedstock — frankly, that's Nestle's problem and the problem of many biofuels producers. If the U.S. is addicted to oil, many producers are addicted to corn or cane, and both sides benefit from diversifying where possible.

2.) Increasing Yield per Ton

There are low-yield biofuels technologies — and high yield in terms of productivity per ton of biomass. At the high end, consider, for example, Coskata's 105 gallons-per-ton and ZeaChem's 135-gallon-per-ton yields. Compared to a technology that yields, for example, 60 gallons per ton (and they are out there), that can reduce feedstock requirements by half.

But there is more than just picking the right technology. Great technologies are those that optimize their yields. For example, the U.S. ethanol industry used to have yields in the 2.5 to 2.7 gallons per bushel range. Today, 2.9 gallons per bushel is state of the art at many facilities, and POET has found ways to increase that to 3.0 gallons in some cases.

Continuous improvement is what has analysts excited over KiOR, too — when first deployed at demonstration scale, the technology was yielding in the mid-60 gallons per ton, based on Southern Yellow Pine. But the company expects to reach 92 gallons per ton by mid-decade — nearly a 40 percent improvement.

3.) Reducing Water Intensity

When drought comes, water is more precious than ever. That's why it was big news when Syngenta announced that it has signed trial agreements with Golden Grain Energy (GGE) of Iowa and Siouxland Ethanol of Nebraska to demonstrate the value of Enogen grain. Both ethanol plants will complete a three-month trial with the specialized corn grain bio-engineered to allow ethanol production to be more efficient, cost effective and better for the environment.

Golden Grain Energy and Siouxland Ethanol will begin their trials in the spring of 2013 [1] with Enogen grain harvested from acres planted this past growing season. Following the trial, each plant will analyze data to discover the efficiencies created from Enogen trait technology. Pending trial results, each plant will then enter into negotiations with Syngenta to sign a commercial agreement.

As we wrote last year in profiling the technology: "So, you get around a 10 percent lift in total capacity (from the speedup), plus energy, water and carbon savings.

"For example, in a 100-million-gallon plant, efficiency improvements enabled by Enogen grain can save 450,000 gallons of water, 1.3 million KWh of electricity and 244 billion BTUs of natural gas, and carbon dioxide emissions by 106 million pounds."

That works out to around 8 to 10 cents per gallon in savings, which can be shared by the grower, the plant or the customer.

Please tune into the Chemical Equipment Daily *for part two of this two-part series. What's your take? Please feel free to comment below! Copyright 2012;* Biofuels Digest [2]

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