

Synthetic DNA barcodes on fruits and vegetables could open the door to food and agricultural transparency

Few technologies can transform the relationship between growers and consumers like the promise of transparency. And with Covid, many of us demand even greater assurance that our food supply chain is as safe as possible. How are growers, distributors, processors, and grocery stores implementing transparency at each point in the supply chain?

I have been working in the agriculture industry for a *long* time. Over 30 years to be exact. But it wasn't until I entered the highly-perishable fresh produce sector a decade ago that I gathered a true appreciation for how complicated – and how powerful – a transparent supply chain can be.

For many deep-rooted and emotional reasons, consumers have a close relationship with their fresh produce, scanning the produce aisle high and low for just the right piece of fruit to take home. And if at a farmer's market, they'll often quiz the farmer on how the product was grown, what crop protection products were used, and when was it picked. Arguably, the consumer's relationship with fruits and vegetables is the most complicated one in the supermarket.

Those are the old days. Or at least that is the past, and singular, view of how consumers connect with the most perishable of products in their shopping cart.

The promise of technology and its impact on transparency will forever change the produce aisle, just like moving from 3G to [5G technology](#).

Different views on produce

When I speak to *consumers* about transparency, they reflect with varied responses. Some will say they want to get to know the specific grower that produced the beans or apples. What type of land was the crop raised on? What chemicals were sprayed, if any? What similar products can I purchase from that particular farmer?

When I speak with *growers*, transparency means building deeper loyalty with retailers and the consumers they serve (with hopes the loyalty is returned). But equally important, it's a way to keep track of the product in case of food safety inquiries and also ensuring the quality of food arriving at its final destination — a nudge for growers to improve transparency.



A push for transparency: Savings & security

Like with most technologies, there must be a benefit for increased transparency to become more ubiquitous. The most tangible benefit is financial, of course. That could come in the form of cost savings by eliminating a portion of the supply chain, or through increased margin at the checkout stand demanded by a premium label.

At the same time, it could also be an opportunity to protect market share. [We've all seen the many recalls for romaine lettuce.](#) We're told of a few brands and bar codes to be aware of, but *how do they know?* The ability to trace-back a product to a particular warehouse or field is very important for a retailer and the consumer.

In the case of a food safety incident, quick trace-back can mean the difference between a small recall involving one or two growers, or a larger investigation that involves tens of millions of dollars of impacted product. And, if consumers fall ill from the incident, a bruised reputation for the retailer or brand, regardless of the outcome.

A tool for telling a story

According to a 2020 study by the Food Marketing Institute (FMI) and Label Insight, shoppers have higher expectations for transparency when shopping online compared to in-store. Think back to the early days of COVID-19. According to FMI, online grocery purchases soared to 27% of all grocery spending for the March/April period of this year, compared to 14% in February.

This increase in online sales will undoubtedly drive consumers' interest in a more transparent system. Why? In the store, you can look and feel the product you are about to purchase. Online, you need something more to tell the complete story of a product – how it was grown, when it was picked, size, and other quality attributes. That's where transparency fills the gaps.

When you go to a grocery store, what do you want to know about your fruits and veggies? Why would you pick a particular brand of berries over another? Or what is it that you like about a particular store's produce section? We often look for certain benefits when we purchase a product. It starts with the basics of getting a good product at a fair price. But beyond that, transparency helps the consumer make a purchase.

According to IRI Research, “consumers are more concerned than ever about where their food comes from. They are not only making their concerns widely known on social media; they are editing their shopping lists based on those concerns”. Not a surprise to see that the food transparency trend is growing, especially in the younger generations.

A demand from millennials

The effect of transparency on purchase decisions is even starker among the Millennial generation. According to a Snacking Trends Report, this demographic is increasingly making purchasing decisions based on “the [tenets of self, society, and planet](#)”, which feeds into sustainability.

Millennials have a real connection to the betterment of the planet, and brands need to be careful not to miss this. They must embrace the new level of transparency that Millennials have elevated. Just “talking the talk” will no longer cut it.

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Farmers demanding price visibility & insights

Farmer acceptance of transparency technology is growing for multiple reasons. In the case of fresh produce, transparency allows the grower to look for efficiencies in the supply chain. Not only with their operation, but in the part of the chain above and below them.

Through an open purchasing platform, a grower may learn what the distributor pays the manufacturer for inputs, which puts them in a better negotiating position with the distributor, or even directly with the manufacturer.

Going the other direction in the supply chain, a grower may be able to directly access consumer insights on their products and brand. In the past, that information may have been maintained by retailers or distributors that, in turn, passed it along to the grower. The net result of this shift is quicker and better-informed decisions about what to grow.

And more importantly, they can look for particular attributes to provide the highest return from the marketplace. Similar to the consumer, it often comes down to economics: can I increase my revenue or lower my costs through the use of new technology that pulls up the shades somewhere else in the supply chain?

Promising technologies in the works

New technology has a way of telling the story of ‘what’s possible’. Here are two promising examples:

Founded in 2013, a Californian company called [safetraces](#) developed DNA “barcodes” that can be added to fruits and vegetables via a liquid spray or wax. What’s so special about that? The company takes a small piece of synthetic DNA from organisms not typically found in the produce section – like seaweed – which they mix with trace amounts of sugar and create a sprayable solution. According to the company, the spray is odorless, tasteless, and poses no food safety risk.

If a problem with the product arises, the DNA on the surface can be swabbed and identified within minutes. Placing the DNA barcode directly on fresh produce significantly reduces the potential for traceback information to be lost. Produce boxes, which traditionally carry the tracking information, are discarded long before anyone catches on to a problem.

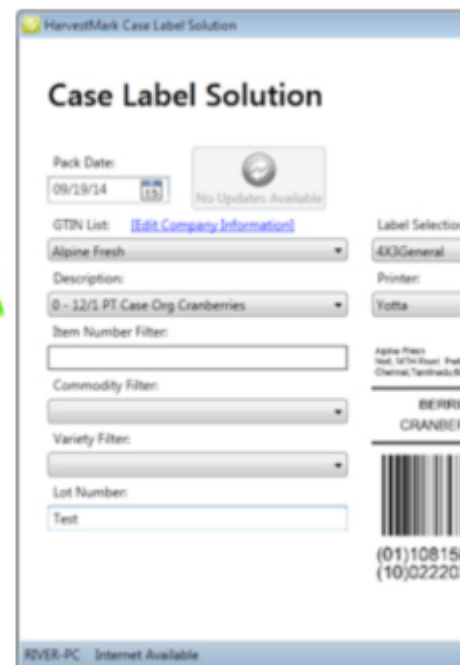
In a different twist on innovative traceability technology, software company [HarvestMark](#) partnered with [iFood Decision Sciences](#) to create a solution that allows consumers to not only view each step along the supply chain, but to provide feedback and reward those brands they feel are doing the best job of transparency.

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The product information is collected and shared with the consumer on an item-level basis. The consumer has instant feedback linked to the product’s age, origin, and location. This allows the grower to see how a specific product performs on the grocery store shelf and then make short and long-term production decisions.

In addition to the quality and analytical measurements provided to the grower, like temperature control, inventory monitoring, and supplier notifications, this traceability system also provides a mechanism for product recall in case there is a food safety incident.



The real power of the HarvestMark technology comes through the integration of both the consumer and analytical supply-chain feedback. A highly perishable raspberry variety, for example, might have great flavor and visual appeal according to consumer feedback. Through the analytics of the traceability software across the supply chain, the grower can maximize the shelf-life of the raspberries and reduce perishability at the store level. The result is increased income for both the grower and the retailer...and a happy customer who returns for repeat business.

The promise of this technology will be optimized even further using blockchain applications, which enables the industry to share data up and down the supply chain while maintaining the integrity of the data at each source.

The bottom line

A demand for transparency stems from both the consumer and the farmer in the hopes of ensuring affordability, safety, and sustainability. Implementing these advances will radically change supply chains in the years ahead. And although consumers may only notice slight differences in the produce section, we'll reap its benefits by paying less for safer food that's less likely to end up in the garbage.

Richard Owen has been a part of the Produce Marketing Association since 2009, when he joined as Director of Global Business Development and has served as Vice President of Global Membership and Engagement for the past three years. Find Richard on Twitter [@richardo_pma](#)

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